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Thesis

ACCOUNTING TREATMENT OF FIXED ASSETS IN THE UNREGULATED INDUSTRIES

by

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CHAPTER I

INTRODUCTION

IMPORTANCE OF SUBJECT

Growth in the Use of Fixed Assets

Fixed assets, which are ordinarily considered to include machinery, equipment, structures and the lands on which those facilities are erected, have become important through the continually increasing substitution of machine methods for hand labor. The use of mechanical agencies of production has been growing at a tremendous rate since the Industrial Revolution when methods of manufacture were changed by those basic inventions which made possible the extensive utilization of mechanical power and machinery. The development of the steam engine, the dynamo and the internal combustion engine, in a relatively few years, has made available a vast supply of power that industry has been quick to apply to new uses and to operations formerly done by hand. The result has been lower costs and greater production, which in turn has brought about further expansion in the use of machinery. Today, manufacturing plants are wonders of mechanical efficiency in which a few men direct the efforts of machines doing the work of an army of laborers.

Obviously, this extensive use of mechanical method is accompanied by a huge investment, not only in the machines but also in the buildings housing them, and in all the auxiliary equipment essential to operations.

This investment is very large both in comparison with the total capital of the corporations and relative to the amount paid for labor employed in operating the plants. Hence, the accounting for the expenditure for fixed assets, the statistical measurement of the cost of using those assets and the determination of the effectiveness with which they are used have become increasingly important.

Growth in Size of Corporations

Parallel to the increase in use of mechanical power and machinery has been the growth in the size of corporations. This growth, arising from the economies of large scale production, has itself permitted more extensive use of mechanical methods with an attendant increase of investment in plant and equipment. Moreoever, the result has been to concentrate this investment in a relatively smaller number of companies. This concentration enhances the importance of the accounting problems incidental to fixed assets for several reasons, the first of which is that the extent of the expenditures involved necessitates an extensive system of recording and controlling. Also, the diversity of plant and equipment, both in regard to location and to kinds of properties, requires more records to be kept, increases the volume of work and brings up a great variety of accounting problems. Furthermore, the remoteness of management from the actual operations necessitates a greater dependence upon reports and records.

Requirements of Federal Income Tax

Although what has been said thus far has been in regard to the importance of fixed assets to stockholders, investors and managers of corporations, the accounting problem also becomes important through the requirements of the Treasury Department with reference to the Federal Income Tax. Even if it were possible for corporations to dispense with detailed systems of accounting for financial and operating guidance, they would be obliged to maintain such systems to meet the tax requirements. The necessity for adequate records is indicated by the following paragraph from the Income Tax Regulations.[1]

> "Art. 41-3. Methods of Accounting. - It is recognized that no uniform method of accounting can be prescribed for all taxpayers, and the law contemplates that each taxpayer shall adopt such forms and systems of accounting as are in his judgment best suited to his purpose. Each taxpayer is required by law to make a return of his true income. He must, therefore, maintain such accounting records as will enable him to do so.-----"

The regulations then proceed to state what classes of expenditures shall be charged to fixed assets, how those expenditures shall be depreciated, and what shall be the basis of determining the loss or gain when the assets are disposed of. Beyond the fact that the Treasury Department requires conformity to certain general procedure, there is another definite reason why corporations should adopt methods satisfactory to

1. U.S. Treasury Department, Bureau of Internal Revenue, Regulations 86, Income Tax

that department. That reason is based on the principle that "the burden of proof is on the taxpayer." In order that the corporation may substantiate and obtain all reasonable deductions from income, it must adhere to acceptable procedure.

Complexity of Problems

The necessity of accounting for extensive expenditures, within a single large organization, subject to the Income Tax requirements, creates innumerable problems concerning both theory and practical application. Expenditures must be so classified, recorded, and controlled that management can be guided in operating the component parts of the organization, and in protecting the interests of owners and creditors. Moreover, the methods adopted must be in conformity to tax requirements. To achieve the desired results and yet to keep the accounting costs within the limits of the value obtained presents many difficulties. To attain or approach the theoretical objectives requires the practical solution of some very real problems.

PURPOSE OF THIS THESIS

The purpose of this thesis is to present in some detail the objectives involved in accounting for fixed assets, to consider the problems that are encountered in attempting to attain those objectives, and to set forth the practical solutions which have been developed.

Since a thorough knowledge of what is sought is essential to understand any problem, the general objectives will be analyzed first.

The reason for the accounting concept of fixed assets, how that concept affects the financial statements, and what its value is to management, stockholders and bondholders will be considered. What constitute fixed assets, the classes into which capital expenditures are segregated, and the reasons for and bases of classification will be presented.

The next thing to be considered is what is necessary to attain the ends desired. In connection with this the theoretical and practical limitations must be considered. The detailed groupings of expenditures necessary to give adequate information for financial and operating control will be discussed. What physical factors, such as type of property, location, use, and rate of deterioration influence the groupings will be analyzed. The bases of values, the theoretical determination of them, the difficulties of reconciling various factors, and the practical obstacles encountered will be pointed out.

In conjunction with the presentation of the problems met, the practical methods employed to attain the desired ends will be outlined. The actual systems of controlling the expenditures for plant, the practical arrangement of the records, the methods of reporting and classifying charges, and the way in which the data contained in the records is utilized will be discussed. The effect of compromises necessary in the practical application of theory, the validity of assumptions made, and the extent to which the actual methods employed approach the theoretical objectives will be given consideration. What limits of accuracy exist in the computations made, what refinements of procedure are practicable and what factors influence the extent of refinement will also be treated.

LIMITS OF THIS THESIS

Limits of Subject

In order to give sufficiently intensive consideration to the material which has been outlined in the preceding paragraphs, this thesis must be confined within certain definite limits, the first of which is the general type of enterprise to be considered. As stated in the title, the subject refers to the "unregulated industries", which will be taken to include those enterprises which are not public utilities or railroads. Transportation, communication, gas, electric, and water supply enterprises which are regulated by either state or federal commissions have been definitely excluded because the so-called regulated industries are subject to uniform systems of accounts established by the respective state or federal commissions having jurisdiction. Since these commissions specify the classification of accounts, what shall be charged to each account, and the exact forms of records to be used, there is not the latitude in application and the diversity of opinion that exists in the unregulated enterprises. Regulated industries, therefore, present too highly specialized types to be given specific treatment in this study of accounting procedure.

Even after the exclusion of the regulated industries, the field must, necessarily, be further restricted to permit adequate investigation. The extractive industries such as mining and oil producing, will not be included because of the highly specialized problems encountered. The questions of valuation of lands and their deposits, and the determination

of depletion, are so extremely technical that they should be the subject of a separate discussion.

The next limitation is with reference to what are to be considered fixed assets. These will be taken to embrace all tangible properties including buildings, structures, machinery, motor vehicles and tools. Land owned in fee and improvements to land, such as fill, grading, sea walls and retaining walls are also included. The more intangible assets taken to come within the limits of this discussion are leaseholds. Patents, trademarks, copyrights and similar intangible assets will be definitely excluded. Goodwill, however, although it may not properly be classified as a fixed asset, must be considered in so far as it arises in connection with the acquisition of going properties, because of the inter-relation of property valuation and goodwill valuation.

Limits of Treatment

Not only in regard to the subject must this thesis be limited, but also with reference to the treatment. The discussion will be concerned with general principles and methods rather than with their application to specific types of business. No attempt will be made to present a definite accounting system because the detailed procedure for any company will depend upon the type of industry, the size of the corporation, the desires of the management regarding statistical reports, and similar factors peculiar to that specific company.

Any discussion of the effect of the requirements of the Treasury Department in regard to the federal income tax must also be limited to a

consideration of the general principles involved. Because the tax regulations are so extremely technical and so extensive in their provisions, their detailed application should be considered with reference to specific conditions.

CHAPTER II

GENERAL THEORY

REASON FOR CONCEPT OF FIXED ASSETS

In order to understand the problems involved in the accounting treatment of fixed assets, we should first investigate the reason why they are thought of as a separate group, and how they differ from other expenditures.

Differences in Rate of Utilization of Expenditures

We shall see that the first difference is in the rate of utilization of the expenditures, a distinction that constitutes the fundamental difference between Balance Sheet and Profit and Loss accounts. In order to develop the relation between the two groups, let us start with a simple transaction in which we assume that a concern starts business with cash of $100,000 and immediately purchases machinery costing $50,000 with which to conduct business. Also assume that the company in its first year of operation paid $20,000 for raw material, $20,000 for labor and $5,000 for rent of a building, and that after selling all its completed products for $100,000 it had $2,000 of raw material on hand. The machinery was found to be of use for nine more years. Since the first purpose of accounting is to find out how much profit was made, the foregoing expenditures should be recorded to indicate that profit.

The expenditures for labor, rent and $18,000 worth of material were all consumed in the year, while only ten per cent of the expenditure for the machinery was consumed. A statement of Profit and Loss would appear as follows:

Sales		$100,000
Less:		
Raw Material	$18,000	
Labor	20,000	
Rent	5,000	
Depreciation of Machinery	5,000	48,000
		$ 52,000

Our balance sheet would show the value of the possessions available for business during the ensuing year:

Assets			Capital	
Cash		$105,000	At start	$100,000
Raw Material		2,000	Profit for year	52,000
Machinery:				
Cost	45,000			
Less Depreciation	5,000	45,000		
		$152,000		$152,000

Balance sheet accounts are, therefore, charged with those expenditures whose value is not entirely consumed within the period for which the profit is to be determined. In practice, of course, the entire amount of such expenditures is first so charged and credits are made to

those asset accounts during the period for the values utilized in production.

In addition to the simple asset accounts used above we find in practice many others among which are goods-in-process, finished goods, materials and supplies, land, buildings, motor vehicles and similar items. The amounts appearing on the balance sheet for all these accounts constitute in effect a valuation of inventories of the respective items represented by the accounts. Some of these inventories such as raw materials, goods in process, finished goods, and material and supplies will be entirely utilized within the ensuing year. Land, buildings, machinery, and equipment, on the other hand, will probably be available for use over a period of many years. This difference in rate of utilization forms the basis of the further division of the accounts into the two groups known as Current Assets and Fixed Assets. Such division, however, is further dependent upon the frequency with which profits are determined. If all assets of a company were consumed within the period for which profits were computed, there would be no necessity for the distinction regarding rate of use. Since land, buildings and similar properties have a useful life far beyond the one year, or shorter periods for which financial statements are rendered, the distinction is necessary.

Although Fixed Assets are consumed more slowly than raw materials and supplies, the buildings, machinery and equipment suffer a certain loss of value as a result of their use in the business. Therefore, an amount representing this depreciation must be charged against the cost of operations in each period, in order that correct earnings may be

determined.

Attempt to Reflect Correct Earnings

To see how the allowance for depreciation influences the determination of operating procedure, we should recall the reason for using plant and equipment. As stated earlier in this discussion, machinery and the facilities incidental to it are used because the resulting production costs are lower than those that would be incurred by using manual labor. Furthermore, new ways of doing things, and new sources of power, make certain mechanical methods cheaper than others. Because of the pressure of competition, management must be ever alert to reduce its costs by further substitution of machinery for labor or by the use of more efficient equipment. Mechanical methods of production, however, require heavy initial expenditures for plant and equipment which have a limited useful life. The initial investment is so large, the proportion of it which is charged off in each period constitutes a substantial part of the costs of operations.

In order that management may intelligently choose its methods of production, the costs of using the various items of plant and equipment must be known. Since the depreciation charge is a relatively large element of those costs, it must be fairly determined in order to make proper comparisons. For example, if a company uses a machine in one instance, and manual labor in another for the same operation, a fair comparison can only be made by including the depreciation charge in the cost of the machine operation. If the entire cost of the equipment, which may have

a useful life of five years, is charged off in the first year, the books will probably show a loss for the first year but will indicate an exceptional profit for succeeding years. On the other hand, if no depreciation is charged during the life of the machine, a profit will be indicated for all years except the one in which the machine becomes worn out. That year will show a huge loss. Since management would be unable to intelligently plan its course on the basis of these calculations, a fair allocation of the depreciation actually incurred must be made to each period. Management can then determine, to a reasonable degree, the relative profitableness of its various equipment.

From the foregoing discussion it is apparent that, because the method of charging the expenditures for plant and equipment may result in either an overstatement or an understatement of earnings for the company as a whole, the method of accounting must be fair to permit an intelligent financial policy. In the first place, if profits are understated, the company's very existence may be jeopardized since difficulty may be found in obtaining loans for working capital and even the company's ordinary credit may be impaired. Moreoever, capital for expansion may be difficult to obtain because low returns will neither attract prospective investors, nor induce existing stockholders to purchase new stock. On the other hand an overstatement of earnings will ultimately result in difficulty either through over-expansion or through dissipation of capital.

To trace the effects on financial policy further, we may first consider the effect of charging the expenditures for new equipment directly to operations when such expenditures are incurred. If this procedure is

started at the inception of the business, when a large outlay for fixed assets is necessary, a deficit would probably be shown which would last for a number of years. Of course, if profits were large enough, this deficit might be overcome at once, but under normal conditions the margin of profit is insufficient, particularly in early years. Although the business might be actually profitable, directors would be unwilling to appropriate money for additions or improvements when the records indicated otherwise. Even if the company did wish to expand, there would be little surplus from which to make the appropriations. New funds would be required, but such funds would be difficult to obtain. Since under pressure of competition no business can remain static, the company might eventually be forced out of existence.

A further consideration is the necessity for planning expenditures for replacement of fixed assets. Since these assets are gradually wearing out, the records should indicate the extent to which their value has diminished in order that an amount sufficient to replace them may be withheld from the distribution of profits. Even if the earnings prove to be sufficient to overcome the early deficit arising from charging the cost of plant to operations, the profits appearing in subsequent years may be dissipated through failure to provide for replacements.

On the other hand, if the expenditures for plant and equipment are not charged against earnings until the facilities have become worthless, the exceptional profits appearing in early years may encourage excessive expansion. When failure to include an allowance for loss of value in each period results in the showing of a profit when a loss is

actually being incurred, output may be increased, selling prices lowered or excessive profits distributed to stockholders. The fictitious prosperity will result in a waste of the resources of the business until a crisis is reached when replacement of plant becomes necessary. As plant becomes worn out heavy charges must be made against operations and the profits of early years will be replaced by diminished earnings. Since the business will begin to indicate a declining profitableness, money for new facilities will be difficult to obtain at a time when it is most needed.

Only the policy of charging expenditures for new plant and equipment to a balance sheet account and then charging a fair amount of the depreciation incurred to each period will provide a fair basis for financial planning. The results enable management to decide the extent to which expansion is desirable, and to conserve a part of profits for replacement of plant.

Preservation of Invested Capital

The correct statement of earnings and its resulting effect on operating and financial policies is the immediate concern of those who have invested money in the business. Both stockholders and bondholders are interested, not only in receiving a fair return on their money, but also in having their original investment remain unimpaired. Because of the difference in the nature of these two classes of investors, we should consider how each is affected by the method of accounting for Fixed Assets.

The stockholders are the owners of the business who have invested money with the understanding that they assume the risks of the enterprise. After all expenses, including bond interest, have been paid, they are entitled to the profits; on the other hand, any losses must be borne by them. If what are shown as either profits or losses are fictitious, the interests of the shareholders may be injured in several ways, depending upon the length of time that the investor holds the stock.

In the first place, we have seen that charging expenditures for the initial plant and equipment resulted in low earnings in early years, high earnings in following years, and finally a drop in profits when replacements were necessary. Some stockholders would be discouraged in the early period and sell their shares but since low earnings would have depressed the price of the stock, the sellers would probably receive less than what they had paid. The purchaser would subsequently receive the higher dividends in the following period of greater earnings. During that period he might dispose of the stock at, of course, the higher market value arising from increased profits. The purchaser would eventually suffer from the lower earnings and decreased market value of the stock. If the original stockholder had kept his shares during the entire period he would have received a fluctuating income, which would have proved undesirable. However, the effect of the improper earnings statement upon operating and financial policy, as previously discussed, may have throttled growth of the company, and impaired the stockholder's investment without affording him an adequate average return.

On the other hand, if expenditures for Fixed Assets were not charged off until those facilities were worthless, or if an inadequate amount of depreciation were charged, stockholders might suffer. Some stockholders might sell in the early years of the company. Since the price of the stock would be high because of the fictitious profit, the purchaser would eventually suffer a loss from subsequent lower earnings and the consequent lower market value of the stock. If the original stockholder had retained his holdings he would not only have experienced a decrease in income but he would also have suffered a decrease in the value of his investment. The fact is that a part of the higher dividends in the earlier period would have represented a return of part of the original investment and not profit. However, since the stockholder was led to believe that the entire distribution was profit, he probably adjusted his standard of living to meet the higher income. A reduction of that income would cause him difficulty.

The investor in bonds is also affected by the method of accounting for expenditures for fixed assets, but in a different way from the stockholder because of essential differences in the nature of the investment. A bondholder does not accept the risks of an owner of the business; he is really a creditor who has advanced money for which he has received an evidence of indebtedness secured by a lien on the company's property. The principal amount is to be paid to the holder of the bond at the expiration of a definite period during which a fixed rate of interest is to be paid by the company at regular intervals. Furthermore, the interest constitutes an expense to the company which

must be met before stockholders receive any profits. Since the bondholder accepts a lower rate of return on his investment in exchange for the assurance of a fixed periodic income and safety of principal, anything which destroys this assurance injures the holder of the bonds.

Because the maintenance of interest charges is dependent upon the profits which are available for the payment of the interest, the earnings of the business must be properly reflected. If earnings are shown to be insufficient for interest charges, the bondholders may force a reorganization. If the deficiency is fictitious, the disturbance of the corporate structure may cause an unnecessary loss to investors. Even if interest payments are maintained, but earnings are shown to be very close to interest requirements, the bondholders may suffer a decrease in the value of their holdings. Since the small margin of safety will indicate a possible inability of the company to pay future interest charges, the market value of the bonds will drop. An investor wishing to sell will be obliged to accept less than the amount of his original investment. If the poor earnings are fictitious, he will have incurred an unnecessary loss. The way in which the profits would be affected in different periods has already been pointed out in the previous discussion of the effect on stockholders. In the case of the market value of the bonds the effect, though indirect, is similar for each period.

The effect of dissipation of the assets of the company is also very important to the bondholders. Since the money advanced by this class of investors is generally secured by a lien on the plant and

equipment, the bondholders wish to have the value of their security maintained. If no depreciation, or an inadequate amount, is charged to periodic earnings and if the resulting profits are distributed to the stockholders, the value of the bondholders' security will be definitely reduced. Furthermore, when the time comes for repayment of the bond principal, the company may not be able to pay. In practice, therefore, bond indentures generally bind the company to a definite policy in regard to depreciation charges.

In addition to the causes already mentioned, failure of the company may cause loss to holders of bonds. Although the security is tangible property, what it will realize at a forced sale is ordinarily much less than its value in a going concern. Since, as previously pointed out, improper accounting may ultimately cause the company to fail, the bondholders are definitely affected by the way in which expenditures are charged.

Necessity of Uniformity for Federal Income Tax

The problem of a correct determination of earnings is also of immediate importance in connection with the Federal Income Tax. The law provides in substance that the tax shall be levied on the net income remaining after deducting all ordinary and necessary expenses incurred in the conduct of the business. If the determination of that income were left to the individual opinion and judgment of each taxpayer, the government would not derive much revenue from this form of taxation. Since the tax is imposed annually on the net profit of the preceding

year, taxpayers could minimize the tax in each year by deferring certain charges in unprofitable years and subsequently applying those charges against earnings in prosperous periods. Because expenditures for plant and equipment are relatively very large and because they may be recorded in various ways, they could afford an effective means of reducing the tax.

How these expenditures could be reported for the taxpayer's benefit can be shown readily by tracing the progress of a company from its beginning. At first the concern would not ordinarily earn large profits because of the initial costs of launching an enterprise. Expensive sales promotion and advertising would have to precede any volume of business. Since production would be low in proportion to the total capacity of plant, the overhead consisting of rent, property taxes, insurance, interest and so forth would be relatively high. As sales and output increased, the overhead would be spread over a greater number of units produced, with a consequent decrease in unit costs, and increase in profits. Under these conditions, the company would prefer to refrain from charging early operations for any part of the costs of the initial plant and equipment. As profits began to increase, the corporation could reduce its taxable income by charging successively increasing proportions of those expenditures against earnings, although this procedure would have to cease when the entire original cost had been written off. However, in normal business there are alternating periods of high and low volume. Therefore, if an interval of restricted output were encountered, the diminution of profits would lead the company to reduce the amount being

charged for the plant and equipment. In a succeeding period of prosperity the charge would be increased.

In order to make income taxation effective, the government must develop a consistent theory regarding the relation between expenditures for plant and equipment and annual earnings. In this respect, the tax laws and regulations have followed the principle, as discussed in preceding pages, that since structures and equipment are not consumed at once but suffer a gradual loss of value as a result of use in producing profits, the earnings of each year should be charged with an equitable share of the original cost.

Profits and losses may arise not only from the use of plant, but also from the sale or other disposal of the facilities. For income taxes, the government must recognize some definite basis for the determination of such gains. This basis must be consistent with that used in the calculation of income from operations. Hence, at the time the property is disposed of, its value is deemed to be the excess of the original cost over the total amount of depreciation previously charged against earnings. Any amount received in excess of this value constitutes a profit; any lesser amount is a loss.[1] The method is theoretically sound because the annual depreciation charges are presumed to measure loss of value.

WHAT CONSTITUTE FIXED ASSETS

Fixed Assets Defined

Although the foregoing discussion has indicated in a general way what fixed assets represent, it has not specifically defined the

1. See U.S. Treasury Dept., Bureau of Internal Revenue Regulations 86, Article 113(b)-1

items of which they are considered to be comprised. Probable length of useful life has been shown to be the basis of classification. According to the theory developed thus far, properties whose usefulness extends beyond the financial period in which they are purchased would be considered as fixed assets. The federal income tax regulations are in accord with this conception and set forth the following practical distinction:[1]

> "Expenditures made during the year should be properly classified as between capital[2] and expense; that is to say, expenditures for items of plant equipment, etc., which have a useful life extending substantially beyond the year should be charged to a capital account and not to an expense account;----"

Since the tax regulations govern to a great extent the accounting methods of corporations, the definition just quoted represents the conventional basis of determining what properties constitute fixed assets. Hence, for practical purposes, fixed assets may be defined as properties having a useful life of substantially more than one year.

The application of the preceding definition is not difficult in the case of any item which is of substantial construction and which has an obvious life of many years. A brick building or a steel tank would be readily recognized as coming under the classification of fixed assets. On the other hand there are many small items whose unit value

1. U.S.Treasury Dept., Bureau of Internal Revenue, Regulations 86, Art. 41-3
2. "Capital" as used here is synonomous with "Fixed Assets". In practice, the terms "charging to capital," "charging to capital assets", "charging to fixed assets", and "charging to plant and equipment", all mean the same thing. "Capital expenditures" are expenditures for fixed assets.

is small and whose life is indeterminate. Pails, small hand tools, portable extension lights, waste baskets, glass ink wells and similar items may last for some time if used carefully. If carelessly handled they may be broken or lost in a few months. Moreover, they are relatively inexpensive. To record these items as fixed assets, compute the periodic depreciation charge, and determine the loss on disposal would require an amount of clerical work far out of proportion to any value derived. Hence, items recognized as fixed assets are restricted in practice to facilities which are durably constructed and of a value above some fairly low minimum. This minimum value would depend to some extent on the size of the company.

Land

Of the facilities which have a substantial life, land is the most lasting because when used for industrial purposes, it does not suffer any decrease in value as a result of wear. Although diminution of value may occur, it is not the same as that caused by the consumption of something material. To see this distinction we should recognize what an investment in land represents. When land is purchased for an industrial site, what is acquired of value is a right to occupy a definite area for all time. Since the price of the site is determined by economic factors such as proximity of raw materials, nearness of market for finished products, and transportation rates, decreases in the value of the land are not attributable to the act of using it. Since title to the land is permanent, no part of the original investment is a proper charge to

future operations. On the basis of this reasoning, the purchase price would remain as an asset until the land was sold.

Leaseholds

Instead of permanent title to land, the right to use the area for a definite term of years may be acquired by the execution of a lease which may be transferred by its original holder to someone else if its terms so permit. Furthermore, this right of temporary occupancy may have a definite value because a lease generally specifies a fixed rental during its term. If, through the operation of economic forces, the rental value of the land increases, the lease will be worth the difference between the total higher rental which might have been paid, and the actual total rental during the remaining life of the lease. In the competition for available sites, corporations will purchase leases from the holders. The amount paid represents an asset, to the purchasing company, that has a limited life during which the value diminishes each year. This diminution is approximately the difference between the actual annual rental and that which would be paid in the absence of the lease. However, leases for a very long term, such as ninety nine years, may not be considered to suffer a measurable reduction in value because of the variable economic factors which affect the rent differential over such a long period.

Depreciable Property

The facilities erected on the land constitute the most

important group of fixed assets as far as accounting problems are concerned. Buildings, tanks, piping, culverts, sewers, turbines, motors, lathes, presses, cranes, trucks, conveyors, boilers, cables, fences and wharves are representative items. They have a probable life of many years, yet they are gradually consumed through use; even though they may be kept in good repair, the time will be reached when repairs will become too expensive. Unlike land, these facilities suffer a lessening of value which must be charged to operations.

THEORY OF DEPRECIATION

Purpose of the Depreciation Charge

The problem of measuring the amount of depreciation is a difficult one. To understand conventional methods we should investigate further the question of loss of value that may occur from various causes. In the first place, the second hand value of a piece of equipment may drop if the price of the article decreases after the company has purchased it. Since the equipment was purchased to use rather than to sell, no actual loss is sustained while the company retains it, and the actual expense of operations can not be considered to increase in the year in which the price drop occurs. The worth of the equipment may also decrease below the purchase price if use of that equipment proves less profitable than anticipated but this decrease is one of earning power rather than of original investment. The loss of value which the depreciation charge attempts to measure arises from neither of the causes just presented but from actual deterioration or diminution of efficiency through use. The

proper basis of the annual charge is the original cost since the purpose of charging the purchase price to a balance sheet account is to permit the distribution of the original expenditure over subsequent periods. The amount of the depreciation charge should represent the proportion of the original investment which is consumed in each year.

Methods of Determining Amount of Depreciation

How much of the original cost shall be charged to operations is of primary importance. One way of determining the annual charge would be to estimate each year the decrease in value of each of the component items of plant. Since the estimate would require actual observation of every structure and piece of equipment by experts the expense involved in making the survey for a large plant would be greater than the accuracy of the results would justify. Any method that did not base the estimate on a careful survey would not only be a guess but would permit deliberate distortion of earnings. Consequently, the conventional method is to compute depreciation on the basis of the assumption that the life of any asset is predictable from past experience. The least expensive procedure is the straight line method which can be best defined by an illustration in which we shall assume that a lathe is purchased for one thousand dollars. If past experience indicates that at the end of ten years of normal use this machine will have to be replaced, the annual depreciation charge will be 1/10 of $1000, or $100. This method assumes that the amount of deterioration is equal in each of the ten years. Actually this is probably not so, but since the life of ten years is purely an estimate,

any attempt to measure differences between years would not be justified. Theoretically, the residual value of the machine at the end of ten years should be considered. Thus, if the scrap value is estimated to be $25 the depreciation base would be $1000 less $25 and the annual charge would be $97.50. Inclusion of the residual value is a questionable refinement of calculation because the market value of the scrap ten years hence is a guess as well as the figure of ten years. Furthermore, the scrap value is ordinarily small in proportion to the original cost.

The straight line method is based on the theory that the depreciation is a function of time. While this concept is fairly true for buildings, the life of production machinery is probably more dependent on extent of use. Hence, depreciation may be calculated on the basis of output. For example, if a machine costing $1000 may be estimated to produce 1,000,000 units before it becomes worthless, the annual charge would be computed by multiplying the unit rate of .001 by the units produced during the year.

There are many other ways in which the depreciation may be computed. Many of them would involve an amount of clerical work which would be impractical in a large corporation. Others give refinement of calculation inconsistent with the accuracy of the basic assumptions which must be made. There are so many variables that the result of any of the methods is purely an estimate. Since the straight line method is the most common, it will be assumed to be the one in use in connection with the other problems to be discussed.

Effect of Federal Income Tax Regulations

Although the Treasury Department has adhered in previous years to the theory that the depreciation charge could be computed properly on the basis of a predictable life for tangible property, Treasury Decision 4422, approved February 28, 1934, indicates a change of the Department's attitude. The provisions of that decision have been incorporated in Regulations 86 as follows:[1]

> "---- The deduction for depreciation in respect of any depreciable property for any taxable year shall be limited to such ratable amount as may reasonably be considered necessary to recover during the remaining useful life of the property the unrecovered cost or other basis. The burden of proof will rest upon the taxpayer to sustain the deduction claimed. Therefore, taxpayers must furnish full and complete information with respect to the cost or other basis of the assets in respect of which depreciation is claimed, their age, condition and remaining useful life, the portion of their cost or other basis which has been recovered through depreciation allowances for prior taxable years, and such other information as the Commissioner may require in substantiation of the deduction claimed.
>
> "A taxpayer is not permitted under the law to take advantage in later years of his prior failure to take any depreciation allowance or of his action in taking an allowance plainly inadequate under the known facts in prior years."

1. U.S.Treasury Department, Bureau of Internal Revenue, Regulations 86, Art. 23(l)-5

The intent of the foregoing provisions seems to be that the depreciation charge shall be based on the actual physical condition of the property at the end of each year, rather than on an estimate of probable life determined at the time an asset is acquired. If taxpayers are to comply with these new requirements, they will incur a tremendous amount of additional work in preparing the necessary schedules, and in determining the condition and remaining useful life of the assets. Furthermore, the comparative basis of financial statements will be distorted if the method of calculating depreciation is changed. A recognition of the difficulty of incorporating the revised procedure in existing accounting systems is shown by the following statement in Regulations 86:[1]

> "If a taxpayer does not desire to have his regular books of account show all of the factors entering into the computation of depreciation allowances, such factors shall be recorded in permanent auxiliary records which shall be kept with and reconciled with the regular books of account."

The attitude expressed in the revised regulations seems to be opposed to existing theories of accounting as stated by the American Institute of Accountants:[2]

> "----How much of a given expenditure of the current or a past year shall be carried forward as an asset can not possibly be determined by an exercise of judgment in the nature of a valuation. The task of appraisal would be too

1. U.S. Treasury Department, Bureau of Internal Revenue, Regulations 86, Art. 23(l)-9.
2. Audits of Corporate Accounts, Correspondence between the Special Committee on Co-operation with Stock Exchanges of the American Institute of Accounts and the Committee on Stock List of the New York Stock Exchange - Pages 6 and 7

vast, and the variations in appraisal from year to year due to changes in price levels or changes in the mental attitude of the appraisers would in many cases be so great as to reduce all other elements in the computations of the results of operations to relative insignificance."

"Some method, however, has to be found by which the proportion of a given expenditure to be charged against the operations in a year, and the proportion to be carried forward, may be determined; otherwise, it would be wholly impossible to present an annual income account. Out of this necessity has grown up a body of conventions, based partly on theoretical and partly on practical considerations, which form the basis for the determination of income and the preparation of balance-sheets today."

Although compliance with the Treasurey Department's requirements would not necessitate the consideration of price level changes, it would involve the exercise of judgment in the determination of the condition and remaining useful life of all the assets. The objections to the vast extent of the task and to the effect of changes in the mental attitude of the appraisers, as expressed in the foregoing quotation, are certainly pertinent. How the Treasury Department will be able to obtain more valid proof of the deductions for depreciation remains to be seen. Since the full import of the new regulations has not become apparent as yet, the remainder of this discussion will adhere to conventional theory.

Recording Depreciation

The periodic reduction of the asset value may be shown by crediting the depreciation directly to the asset account. The balance of that account will then represent at all times the depreciated value of the original investment. This procedure is not desirable. Since in practice, depreciation is most conveniently computed by applying the rate to the asset balance, the base will be continually diminishing. There is no theoretical or practical advantage in such a basis because the object of calculating depreciation is to reflect the decrease of the original value. The determination of the proper rate to apply to a diminishing base involves a refinement that gives results which are no more accurate than those obtained by applying a fixed rate to the original cost. The straight-line method, however, cannot be used conveniently when depreciation is deducted from the asset since the original cost is obscured. In a large company, a tremendous amount of clerical work would be necessary to compute depreciation and to retain the identity of specific asset items on the records.

The procedure of crediting depreciation to a reserve account is more desirable because of its practical advantages. The book value of the assets can be determined readily by deducting the reserve from the correlative asset account. Moreover, the possibility of comparing original investment and accrued depreciation is desirable in determining financial policies. Also, depreciation may be computed easily. A very strong advantage to the accountant is the retention of the identity of

specific items and their original cost. This is important for statistical and cost accounting determinations. It is also important because items which have been sold or scrapped must be identified on the records in order that their value may be deducted and the loss or gain recorded.

Because the title of the account "Reserve for Depreciation" is rather misleading to those who are not accountants, the following question is frequently asked: "What becomes of the money represented by the reserve?" The answer is that unless a reserve fund has been established, the actual money retained in the business by charging depreciation against profits has probably been used for purchase of inventories, additional plant or other assets. The use of a reserve account does not mean that the total of the reserve represents money available to replace the asset. If cash equal to the amount of depreciation is put into a fund annually, the reserve account will then represent money available for new plant. If a profitable corporation can earn more by using the money in its own business, it will not establish a fund. Generally, therefore, the depreciation reserve merely represents the estimated decrease in value of the fixed assets and should be deducted from the asset account on the balance sheet.

APPRECIATION

Causes

In the discussion of depreciation, mention was made of possible decreases of property values from causes extraneous to the operation of

the business. Values may also increase from those causes. Thus land may become more valuable through population growth, the expansion of surrounding industries or improvement of transportation facilities. A rise of the general price level will enhance the value of plant and equipment on the basis of replacement costs. An increase in wages in the construction industry, or a scarcity of materials will have the same effect.

Arguments Relative to Recording Appreciation

Balance sheets of corporations sometimes reflect this appreciation in value of the fixed assets, on the theory that balance sheets should show true values. By charging the amount of appreciation to an asset account and crediting Capital Surplus, the appearance of the financial condition of the company is improved. Although the recognition of a permanent increase, as in the value of land, may not be objectionable, the desirability of recording appreciation arising from higher price levels is doubtful. Experience has shown that since a high level of prices is ultimately followed by a lower one, the appreciated values will have to be reduced. As long as the properties are held, the company experiences no actual gain or loss from changes in replacement costs. The corporation originally spent a certain sum of money for improvements which, in the case of depreciable properties, suffer a gradual loss of value through use. The object of accounting is to determine as nearly as possible what proportion of the original cost should be charged to current operations and to show how much of the original investment remains to be consumed. To record the effect of uncontrollable economic forces does not seem to be a

direct function of accounts. The best that financial statements can indicate is an approximate measure of actual transactions to be interpreted with reference to economic conditions.

CHAPTER III

PRINCIPLES OF CLASSIFICATION OF FIXED ASSETS AND RESERVES

CLASSIFICATION ACCORDING TO RATES OF DEPRECIATION

In order to use the information afforded by a record of the original cost of fixed assets, the expenditures must be classified into certain groups based on various factors, the first of which will be differences in depreciation rates. By grouping assets which take the same rate, the computation of the depreciation charge is facilitated. The classification may be represented by separate general ledger accounts or by subdivisions of controlling accounts. Reserves may also be classified in the same way as the assets to provide a ready means of determining the amount of depreciation accrued for the respective assets.

Major Classification

Since land is not considered subject to depreciation, the expenditures for land constitute a separate group in which the amounts paid for very long term leases might also be included. The investment in land frequently appears on balance sheets as an item separate from depreciable property, in order to reveal the true relation between assets and depreciation reserves.

The cost of acquiring leases having moderate terms of years constitute a second major group. Since the rate at which the original

investment is amortized is dependent on the term of the lease, the rates will be different for many of the leases. In order to compute the amortization, a record must be kept of the cost of each individual lease.

Buildings, machinery, and similar facilities, whose value is reduced through wear, constitute a third major classification. In a large corporation, the number of different items of equipment is tremendous. This is particularly true of integrated industries, whose activities embrace many different fields of manufacture and distribution. Within a single organization, the investment in fixed assets may include foundries, machine shops, power plants, rubber factories, and plants for the production of fabrics. In some corporations, railroad cars, trucks, steamships and other transportation facilities will be owned; even retail outlets, with the accompanying investment in buildings and equipment, may be included. Each of the separate activities, in turn, embraces a multitude of different structures and equipment. The power plants will include boilers, stokers, feed water heaters, piping, pumps, instruments, turbines, generators, compressors, condensors, switchboards, wiring, motors, cranes and other equipment. Machine shops will include lathes, radial drills, shapers, presses, milling machines, motors, power hammers, benches, vises, taps, dies, and hand tools. Each of the items just enumerated represents only a general title for a multitude of pieces of equipment of varying sizes and kinds. For example, pumps may be either reciprocating or centrifugal; the reciprocating pumps may be either steam driven or motor driven; steam driven reciprocating pumps may be either simplex or duplex;

simplex pumps will differ in size and construction. In order to provide a systematic record of the investment in this variety of items, and to facilitate the calculation of depreciation, the assets may be classified on the basis of depreciation rates.

Effect of Physical Factors on Rates

The actual rate at which a specific piece of equipment depreciates is dependent upon a number of variable factors. In the first place, physical deterioration will be caused by erosion, corrosion, abrasion, vibration, constant strain, and shock. The deleterious influence of these forces will be dependent upon the ability of the equipment to withstand them and also upon the extent that the equipment is exposed to them. Therefore, the depreciation will depend upon construction and service.

In the matter of construction, facilities will differ. Buildings may be of brick, concrete, frame, metal or combination of those materials. The brick and concrete buildings will suffer less from corrosion and abrasion than metal ones. Pipes of certain metals will be less eroded than other kinds. Forged steel machinery will withstand shock better than cast steel equipment.

On the other hand the service required will result in different lengths of life for two similar pieces of equipment. Steel pipe used for corrosive substances will have a shorter life than pipe used for water. Pipe used for low pressures will last longer than that for high pressure. Motors operated continuously will have a shorter life than those in intermittent service. Steel structures near the seacoast will deteriorate

more rapidly than those in a dryer climate. Rotating apparatus will be subjected to greater vibration at high speeds than at low speeds.

Because there are so many variable factors, any theroretically exact determination of depreciation rates is impossible. For practical purposes, a reasonable estimate must be made on the basis of past experience. Since the rates are only estimates, minor differences may be disregarded. On this basis, assets which are similar, both in construction and type of service, may be assumed to take the same depreciation rate. In this connection, the federal tax regulations state as follows:[1]

> "----the allowances shall be computed and recorded with express reference to specific items, units, or groups of property, each item or unit being considered separately or specifically included in a group with others to which the same factors apply."

What constitutes a unit will depend upon the relation of the component parts of the particular asset under consideration. A building will serve as an illustration. Theoretically, the paint, the roof, the walls, the foundation, and the plumbing will depreciate at different rates; practically, however, these items are but parts of a unit, the building, which may be considered to have a certain length of life as a whole. The rate of depreciation of this unit will depend upon the rates pertaining to the component parts and also upon the extent to which these parts are kept in repair. Any facilities which do not contribute to the existence of a building would not be a part of the unit. A lathe for

1.U.S.Treasury Department, Bureau of Internal Revenue, Regulations 86, Income Tax. Art. 23(l)-9.

example, would not be classified with the building.

The depreciation rates adopted should conform to the requirements for federal income taxes. Although the Bureau of Internal Revenue does not stipulate the specific rates to be used, it does limit the rates to those which can be shown to be reasonable. In order to furnish a rough guide, the Bureau published a report,[1] in 1931, of its depreciation studies in which were listed suggested rates for various types of property. The following quotations from this report indicate the desirability of classification:[2]

> "The use of the rates of depreciation based on the probable useful life of the various assets shown hereafter is not prescribed in any particular case, and employees of the bureau, as well as taxpayers are cautioned against applying them arbitrarily. They are set forth solely as a guide or starting point from which correct rates may be determined in the light of the experience of the property under consideration and all other pertinent evidence".
>
> "While the following pages tabulate a large number of individual items of property subject to depreciation, it is not intended that taxpayers must set up property accounts in such detail. It is hoped, however, that the lists of assets shown will assist taxpayers in grouping their assets having the same uses and life under separate accounts, to the end

1. Depreciation Studies, Preliminary Report of the Bureau of Internal Revenue.
2. Ibid page 1

that the portion of the depreciation bases of plant and equipment extinguished during the year may be determined with some degree of accuracy, which is not possible when a composite rate is applied to mixed property composed of assets in which there exists great variation in the life thereof. With such groupings the verification of the depreciation deductions will be facilitated, and, what is of more importance, taxpayers will be able to give full effect to their own experience and the developments within their industry which may affect all or only part of their assets from year to year."

Effect of Obsolescence

Although the discussion, thus far, has considered only physical deterioration as a factor in the determination of depreciation rates, fixed assets may also suffer loss of value through obsolescence which may act in two ways. Equipment may suddenly become obsolete as a result of new inventions or the discovery of new processes or products. Since these factors are not predictable, they can not enter into the estimate of depreciation rates. On the other hand, the progress of science and invention indicates that normal improvements will be made upon almost any process or method of construction, which will cause equipment to be discarded prior to the time it actually becomes worn out. Since this form of obsolescence is certain to occur it should properly be given consideration in the estimating of rates. The weight of this factor

would have to be determined from past experience in regard to specific types of property. The Bureau of Internal Revenue recognizes the validity of including an allowance for normal obsolescence.[1] The tax regulations also permit an increase in rates when obsolescence arising from radical changes can be shown to be actually present.[2]

Improvements on Leased Property

One other factor must be considered in determining rates applicable to certain classes of fixed assets. This involves the distinction between improvements erected on owned land and those on leased land. In the case of owned land, the rates are solely dependent on physical deterioration and obsolescence as previously discussed, but when facilities are on leased land another principle must be considered. Buildings and improvements permanently affixed to the ground are construed by law to constitute real estate; likewise, certain improvements to a building are considered a part of the building. While the specific interpretation of what items are real property depends upon the laws of each state, whatever is considered as real estate reverts to the owner of the land at the expiration of a lease, unless there is a contrary agreement. Hence, the rate at which expenditures for certain fixed assets are consumed is dependent on the term of the lease.

To pursue the matter further, assume that a plant consisting of a brick building, some underground piping, machinery and a steel safe

1. Regulations 86, Income Tax, Bureau of Internal Revenue - Article 23(l)-1 Also see Bulletin "F" for a detailed discussion of obsolescence.
2. Regulations 86, Article 23(l)-6

on wheels, is erected by a lessee on a parcel of land leased for twenty years. Assume that on the basis of normal depreciation the building would last 30 years, the underground piping 8 years, the machinery 10 years, and the steel safe 40 years. Since the life of the building is longer than the term of the lease, the normal rate of depreciation would not suffice to charge the entire original investment to operations during the time the structure would be used by the lessee. The original cost should be amortized over the term of 25 years in order to charge each year with the proper proportion of loss of value. Of course, the building will have a value at the time it passes into the ownership of the lessor, but its entire worth to the lessee has been lost. The investment in underground piping represents a different condition. Since the piping will be worn out prior to the expiration of the lease, it should be depreciated at the normal rate. If the machinery and office equipment is all of such a nature that it constitutes removable (personal) property, its useful life bears no relation to the term of the lease. The machinery in the present illustration should be depreciated over a period of 10 years. Since the safe, whose normal life exceeds the term of the lease, can be moved to some other location for use at the expiration of the lease, the normal depreciation rate should apply. The foregoing principles are in accord with the requirements of the Bureau of Internal Revenue.[1]

In some cases the lease contains an agreement that certain facilities legally construed to be real property may be removed by the lessee at or prior to the expiration date. If the useful life of these

1. Regulations 86, Article 23(a)-10.

facilities exceeds the term of the lease, they should be depreciated at normal rates, provided that the removal will not destroy their usefulness. Practically, however, the right of removal will not be exercised for certain properties. In the illustration previously given, the building might be erected subject to the right of removal. If the exercise of that right is impracticable or improbable, the investment should be amortized over the life of the lease, since the obvious intent is to limit the useful life to such a term.

Extent of Subdivisions of Classification

The extent of the subdivisions into which the fixed assets will be classified, upon the basis of the principles outlined in the preceding discussion of depreciation, will depend upon the number and diversity of the asset items. A major division must be made between assets subject to amortization and those subject to depreciation. The cost of assets amortized must be recorded with reference to the respective leases, while the investment in depreciable assets must be classified with regard to deterioration and obsolescence. For practical purposes the subdivisions must be broad enough to avoid an unreasonable amount of detail. A small organization having only a few items of each of a few classes of equipment might maintain separate accounts for each class. Thus, lathes, milling machines, drills, grinders, and presses might each constitute a separate classification. On the other hand, a very large company might group all of these items under a general classification of machine shop

equipment. The broader the classification, the more nearly does the group rate represent an average rather than a specific rate. However, the expediency of using broad groups is justifiable because of the impossibility of any exact prediction of the life of an individual item. Too much refinement of classification is not consistent with the limits of accuracy within which depreciation can be estimated.

CLASSIFICATION FOR COST ACCOUNTING AND STATISTICAL PURPOSES

Bases of Distribution of Burden

While classification on the basis of rates of depreciation is a fundamental requirement, the investment in fixed assets must also be classified in a way convenient for the purposes of cost accounting and statistical analysis. In order to determine the relative profitability of specific operations or departments, the costs of using the respective structures and equipment must be computed. Certain costs, such as depreciation, insurance, taxes, and interest on the investment are approximately proportionate to the value of plant and equipment. In order that these costs may be allocated readily on the basis of this proportion, the investment in fixed assets must be classified in relation to the cost groups which are dependent upon the type of operations being conducted. Before considering the different possible arrangements of groups, however, we should consider to what extent certain fixed charges are related to the investment.

Depreciation is, of course, a function of original cost. Among assets taking the same rate, any allocation of depreciation is proportionate to the investment. Property insurance for practical purposes is sometimes distributed on the basis of asset values. Theoretically the insurance is based on a combination of risk and depreciated replacement values. However, when a policy covers an entire plant, any detailed distribution of the premium will have to be on a proportionate basis. Property taxes also must be apportioned since assessments do not indicate any detailed distribution.

Effect of Type of Industry

The type of industry is the first factor affecting the classification. Industries in which the operations consist of processes constitute a distinctive type, of which chemical plants and oil refineries are good examples. Since costs are accumulated for each process, the investment in fixed assets would be classified accordingly. Under each process classification, however, subdivisions would have to be maintained on the basis of depreciation groups.

Enterprises engaged in the manufacture of units constitute a second type. Foundries, machine shops, and shoe factories are examples. In this type, the major division will be by departments with a further segregation under each, according to operations performed. Here again, subdivisions would have to be maintained on the basis of depreciation rates.

A third type of industry is represented by marketing and distributing enterprises, in which the classification of fixed assets is dependent upon the nature of the enterprise. Frequently the major classification is on the basis of general departments with subdivisions according to geographical locations. Under each location a further subdivision would have to be made with reference to depreciation groups.

FORM OF FINAL RECORD

Factors To Be Considered

The way in which the investment in fixed assets is recorded in the ledgers is dependent upon the requirements of the classification. Of all the factors just discussed, arrangement for proper calculation of depreciation is the most important because the determination of the proper charge to operations for the business as a whole is more essential than the calculation of the proportion of that charge to be allocated to various operations. Hence, ledger records should be designed with first consideration for facilitating depreciation computations. Although the necessity for grouping assets according to rates of depreciation has already been shown, one other factor is equally important. The assets must be recorded in such form that depreciation will not be accrued to an amount greater than the original cost of the asset. Since the dates on which items are added to plant are a determining factor, the records must be arranged with reference to them.

The ledgers must also permit the identification of assets sold, scrapped or abandoned, in order that both the cost and reserve may

be cleared from the accounts. This requirement accentuates the necessity for recording the cost of each individual unit of property. The record of fixed assets should also show the full description of each specific item, including type of equipment, make, model, size and serial number. In the case of continuous structures such as pipe lines, sewers, and power lines, the total length of each size should be shown with the correlative cost in order that the cost of a part of the facilities may be computed if only a part is retired. This necessity for adequate information for recording retirements should be considered in determining what is to comprise a unit of equipment. A unit should not include a number of independently removable facilities whose costs are not proportionately similar. In addition to description and cost, the date of installation is important, not only for identification of the asset but also for calculation of the depreciation accrued to date of retirement.

The identification of units is also essential to permit statistical and cost accounting distributions of expenses. In a large organization the units are so great in number and so varied in type that the record can not be arranged to meet all of the requirements without a certain amount of analysis. For example, certain assets might be classified under the general departmental caption of "Machine Shop Equipment". Under that heading there might be further subdivisions, on the basis of depreciation rates, between automatic screw machines, radial drills and presses. If a comparison was to be made between individual machines or groups of similar machines, the necessary data would have to be computed from the detailed record rather than from classification totals. How the

assets are to be recorded with reference to statistical and cost accounting classification will depend upon the frequency with which the data are to be obtained and the expense of maintaining the record.

Another factor influencing the form of final record is the possibility of using the data in the determination of values for fire insurance. The insurable value of property is based on the reproduction cost less the actual depreciation. While the book depreciation is not an important factor since it will not always coincide with the actual condition of the property, the book value of the property may serve as a rough guide. The record of original cost, however, is of definite value because, if dates and costs are shown for each unit, price level indices may be applied to convert the values to present reproduction costs. Competent persons can then estimate, from observation of the properties, the extent of depreciation sustained. Previous discussion has indicated that this much of the insurance information will be contained in the records because of other requirements. However, further detail is necessary for insurance because certain improvements such as grading, excavations and foundations below the ground are not considered susceptible to damage by fire. In order that these items may be eliminated from the insurable value, the records should show a segregation of the costs. Thus, the cost of the superstructure of a building should appear separately from that of the foundation and incidental excavation or fill.

With the exception of the insurance information just discussed, all of the other requirements will be served best by recording the complete cost in place of each unit of equipment. Since the total for a

unit may be composed of a number of small expenditures, the use of an intermediate record permits their accumulation without burdening the final record because only the total need be transferred to the asset account. Details of cost for insurance purposes or for calculating partial retirements can be obtained from this intermediate record.

Arrangement to Meet Requirements

Since the actual form of the final record depends upon the type of industry, the size of the corporation and the accounting system, only a few general comments can be made in regard to conventional procedure. In the first place any company of substantial size will be obliged to maintain subsidiary ledgers controlled by accounts in the general ledger. The subsidiary record may consist of a separate ledger sheet for each asset group in accordance with the depreciation classification. Where investment is desired to be recorded for individual locations, as in the case of marketing enterprises, a separate sheet may be used for each location. This sheet might be divided into columns for the segregation of the assets by depreciation groups. The same arrangement might be used for recording investment by departmental classification when the departments are relatively small. These records do not permit the depreciation reserve to be shown for each correlative unit. To accomplish this, the record must provide a separate sheet or card for each unit, on which both the cost and the reserve may be shown. This form is desirable where the net book value must be determined frequently, since computation of the accrued depreciation is not necessary

each time the data are required. Card records also facilitate statistical distribution since the cards may be sorted into any desired groups.

The records must be designed with the further object of preventing depreciation accruals in excess of the original cost. Sheets or cards for individual units are excellent for this purpose, since the amount of the reserve for each item is always apparent. When assets added at different times are grouped on one ledger sheet, some device must be adopted for eliminating the cost of fully depreciated items from the periodic calculation of depreciation. If a separate sheet is used for each depreciation group, a column may be provided in which the cost of fully depreciated assets may be recorded. The depreciation base will be the total of the original costs minus the total of the fully depreciated items. This device is not practicable when a number of depreciation groups are present in columnar arrangement on one sheet. Under this condition, an auxiliary depreciation record must be maintained, consisting of sheets arranged by depreciation periods and rates, on which may be recorded the additions and deductions applying to the respective periods. Thus, the retirement of an asset would be recorded on the sheet covering the period in which that asset was originally added. The balance appearing in any fully depreciated period will be eliminated from the depreciation base. Since this method provides for the computation of depreciation by totals, it does not permit the statistical distribution of depreciation charges for individual units on the basis of direct calculation.

CHAPTER IV

ADDITIONS - NEW CONSTRUCTION

Whatever the form of the final record may be, its worth is dependent upon the extent to which the values recorded represent the investment in fixed assets. The discussion to follow will consider what constitutes the cost of new construction and how the elements of cost can be accumulated to furnish the information required for the records in accordance with the principles previously discussed.

ELEMENTS OF COST OF LAND

Purchase Price of Land

The first item to be considered is land. If the site acquired is devoid of any improvements, the purchase price is entirely applicable to the investment in land. However the total amount paid to the seller may represent something more than the purchase price of the asset. Assume, as an illustration, that the site is bought on February 1. If the assessment date for local property taxes is January 1, the seller will have to pay those taxes for the ensuing year. Since the seller will only have the use of the property for one month, he may require the purchaser to reimburse him for the proportion of taxes applicable to the remainder of the year. From the point of view of the purchaser, this amount represents prepaid taxes rather than a part of the cost of the land. The total amount paid in a land transaction should be analyzed to determine whether it includes payments of the

type just mentioned which are not a proper charge to the cost of the asset.

If buildings and other improvements are already on the land when it is bought, the purchase price may not be entirely applicable to land. When entire area of the site is larger than that required for immediate use, some of the buildings may be retained to be rented. A part of the total purchase price should be assigned to these depreciable assets on the basis of fair value; the remainder of the total will represent the cost of the land. However, if the improvements on the property must be destroyed to permit the land to be used for the purpose for which it is acquired, the entire purchase price represents the investment in land. Even though the improvements would have a substantial value if retained, the fact that the property is bought with the intent to demolish them indicates that the land is what is valuable to the purchaser.

Other Charges to Cost of Land

The cost of land also includes the fees paid for legal and professional services in connection with securing title. These services generally include surveying the boundaries, investigating title, searching for unpaid taxes, conducting negotiations, preparing the necessary documents, and recording the deed. Brokers' commissions paid by the purchaser also constitute a part of the cost. These fees are properly a charge to the asset account rather than to current expenses because the value of the services remains as long as the land is retained.

Certain other expenditures in connection with newly acquired property may be considered to be a part of the cost of the land. These include the expense of removing existing structures, removing trees, erecting retaining walls, filling low land, and grading, in order to prepare the site for use. Such work may be considered to enhance the value of the land itself. Furthermore, the value of these improvements remains as long as the land is held. Of course, expenditures for excavation, filling, and grading incidental to the construction of depreciable improvements constitute a part of the cost of those improvements rather than of the land.

After the land has been acquired, certain further expenses may be incurred because of public improvements adjacent to the property. The town or city may surface the abutting street, widen the street, install curbs, extend sewers, or install water mains. When these improvements are made, the owners of abutting property are assessed for a proportion of the cost. These betterment assessments constitute a proper charge to the investment in land since the value of the site is permanently increased.

ELEMENTS OF COST OF LEASES

The expenditures which constitute a proper charge to the investment in leases are similar to those just discussed with reference to land owned in fee. The amount paid to acquire the lease is the first element of cost, to which may be added the payments for legal and professional services incidental to the acquisition.

The problem of accounting for improvements already on the site is, however, somewhat different than for owned land. If the improvements were erected by the lessor, the lessee acquires no title. In some cases, the former lessee from whom the lease is purchased may have erected facilities with the agreement that they shall remain his property subject to the right of removal. Under these conditions the price paid for the lease may include an amount for the fair value of the improvements. If the depreciable assets are to be retained, they should be recorded at a fair value; the remainder of the purchase price will be the cost of the lease. If the improvements are to be immediately demolished, the total purchase price constitutes the cost of the lease, on the basis of the reasoning followed in the discussion of land. The segregation between the investment in lease and structures retained may seem to be a needless refinement in those cases where the structures will be amortized over the life of the lease. However, the distinction permits statistical comparison of owned and leased locations on a similar basis. The fixed charges for leases may be compared with those for land, while the charges for depreciable improvements on leased sites may be compared with those on owned land. Furthermore, a comparison can be made between the investments in each class of assets. Where the life of the assets acquired is less than the term of the lease the distinction between value of tangible property and that of the lease is essential for depreciation calculations.

In the case of leased land, expenditures may be necessary to remove existing structures, erect retaining walls, fill low land and

grade, in order to use the site. Since these improvements enhance the worth of the land, their value becomes identified with that of the lease. Hence, their cost constitutes a charge against the investment in the lease. This reasoning is in accord with that followed in regard to similar expenditures on owned land.

ELEMENTS OF COST OF CONSTRUCTION

Although the determination of the cost of land and leases is important, the accumulation and allocation of the costs of construction requires even more consideration because of the greater difficulties in accounting. Actual construction may be done either by the company itself or by an outside contractor. While the problems of allocating the charges are similar in each case, the accumulation of charges presents more difficulties to the accounting company when its employees do the work. Therefore, this discussion will consider first the elements of cost with regard to work done by company forces.

Labor

Labor is the first element. The expenditures for direct labor incurred in transporting, erecting and installing structures and equipment comprise a part of their initial cost. The wages of laborers, mechanics, helpers, foremen, truck drivers, and crane operators are examples.

Material

The second element is material, either new or reclaimed. When new material is purchased, the question arises as to the method of accounting for discounts, since there are two possible ways. The gross price may be charged to construction and the discount credited to Profit and Loss as an earning, or the net price may be charged to construction. The conventional procedure is to consider quantity discounts as a reduction of the purchase price. With regard to the treatment of discounts granted for prompt payment, procedure is divided, although the conservative method is to treat these also as a reduction of cost of construction. However, the device of showing cash discounts as earnings is concerned primarily with the financial control of current assets rather than the fixed assets. Since the discount is ordinarily small, about two per cent, its effect on the book value of fixed assets is not very important. Other factors such as depreciation rates and price level changes affect the accuracy of the recorded values to a greater extent.

The cost of new material should include charges paid for transportation. Where material is purchased f.o.b. shipping point, these will include the cost of shipping by water, rail or truck to the destination. Although the inclusion of demurrage charges is debatable, it may be justified on the grounds that it represents an actual expenditure incurred in obtaining the material. To the transportation costs should be added the expense of loading and unloading. Certain other expenditures may also be made for handling the materials when a central warehouse or

material yard is maintained. A proportion of the expenses of such central depot represents an additional handling cost which may be charged to the material disbursed. Where the depot is maintained solely for a specific construction project, there is no doubt that the expenses apply to that project. However if the warehouse or yard is maintained primarily for the ordinary operations of a going business, the allocation of a proportion of the expenses to construction materials may be objectionable since the expenses would be incurred even if no construction were being done.

Not all of the material may be new, since some of it may have been salvaged from facilities demolished. The valuation of this reclaimed material must be somewhat of an estimate. The value may be established by adding to its junk value, at the time it was removed, all amounts subsequently expended to recondition it for use. For example, the cost of reclaimed steel pipe might consist of its junk value on the basis of weight plus the cost of cutting, welding, scraping, and painting. In some cases the original salvage value may be determined by deducting from the estimated final second hand value the estimated cost of reconditioning. This method may result in a higher reclamation value if the expense of reconditioning is small. To the costs arrived at by either method should be added the transportation and handling charges as previously outlined for new material.

Miscellaneous Direct Expenses

In addition to the direct charges for labor and material there are many miscellaneous expenditures which constitute a direct charge to the cost of construction. Traveling and living expenses of workmen, foremen, superintendents and engineers should be included. Amounts expended for meals for men working overtime are also an item of cost. Gasoline, oil and coal required for the operation of apparatus such as steam shovels, cranes, hoists, compressors, pumps and trucks are other items. The cost of drills, picks, shovels, saw blades and similar tools consumed through use on the project should be charged. Other examples of costs to be included are steam, electricity, gas and water consumed during construction. The amount of any of these charges is directly dependent upon the extent to which the respective services or commodities are used.

Engineering, Supervision and Administration

Engineering, supervision and administration represent more indirect costs. There can be no question regarding the propriety of including these items when the expenditures are made because of a specific construction project. The expenses of making surveys, laying out plans and making blueprints are legitimate charges to construction; the wages, living expenses, and traveling expenses of engineers, superintendents, timekeepers and clerks employed on a specific job are a direct part of the total cost. However, when the engineering or supervising personnel is employed as a part of a permanent staff to direct both maintenance

work and incidental company construction, the attempt to charge a portion of the salaries and office expenses to new construction is open to objection. The undesirability of such procedure is clearly stated by the Federal Reserve Board in a publication entitled "Verification of Financial Statements", as follows:

> "While it may be considered permissible to make a charge to 'additions to property' for factory overhead cost, e.g., time of superintendent and his clerical force employed on construction work, etc., such a charge can not be regarded as conservative business practice, inasmuch as it is probable that the overhead charges of a plant will not be decreased to any great extent when additions are not under way; consequently, the absorption of part of these charges in property accounts when additions are in progress reduces operating costs below those of periods in which no construction work is being done."

The foregoing criticism applies with equal force to the allocation of any expenses which might be fairly fixed in amount regardless of incidental plant construction. This objection has been already mentioned in the discussion of warehouse handling charges. The distribution of shop overhead in the reclamation or manufacture of construction materials might also be subjected to the same criticism. The objection applies to the effect on the annual statement of earnings rather than to the effect on the book value of the fixed assets. Although the argument may be advanced that the overhead actually did represent a part of the cost of

the asset, there is a possible objection to the inclusion of these indirect costs because of the impossibility of accurately measuring them. If the allocation is not on a reasonably conservative basis, the asset value may be inflated. Assume as an example, that the warehouse overhead is distributed monthly in proportion to the value of materials disbursed; assume, further, that in a particular month the amount of materials disbursed for maintenance and operations is small. Then, any materials withdrawn for use in construction will be charged with a very large amount for overhead. A similar distortion could result from the proportional distribution of any type of overhead. Furthermore, the consistent application of the theory that overhead should be allocated to new construction would lead to an attempt to distribute the expenses of the purchasing, payroll, accounting, and administrative departments. The objections already stated would apply even more definitely to such an attempt.

Other Costs

Another possible element of cost the nature of which is akin to overhead, is the charge for the use of construction equipment owned by the company. Large corporations sometimes have their own derricks, hoisting engines, cranes, concrete mixers, compressors, dump trucks and similar facilities, for which a daily or hourly rental charge may be made to departments using the equipment. This rental will be based on the amount of the fixed charges, such as depreciation and insurance. While

the procedure is satisfactory for the interdepartmental distribution of maintenance costs, its application to new construction is open to the same criticism as given in regard to overhead. The argument in favor of including the charge in the construction cost is that the company would be obliged to rent the equipment if it did not own it.

Certain expenditures for fees and permits may be charged to new construction. Fees paid to municipalities or states for inspection of steam boilers, plumbing, wiring, sewers, and structures prior to placing these facilities in operation should be included. The costs of building, wiring, storage, street obstruction, and similar permits also constitute a proper charge. The fees and permits referred to are those which are peculiar to new construction. The recurring expenses of periodic inspections or annually renewable licenses and permits subsequent to the start of operations constitute a charge to current earnings.

Interest on investment during construction is sometimes recognized as a part of the cost. For example, when the proceeds of a bond issue are to be used for the erection of a plant, the interest which accrues prior to completion of the project may be charged to the fixed assets. The inclusion of interest is neither conservative nor practical when current funds are used for relatively small additions to property.

The discussion, thus far, has been with reference to construction by the company's own forces. When an entire project, or only a part of it, is done by contract, the amounts paid to the contractors represent direct costs to the company. In addition, overhead, engineering, interest and similar expenses may be incurred. The treatment

of these items has already been considered.

Errors of Construction

The assumption has been made in the preceding paragraphs that the value of all the expenditures was retained in the completed project, but this is not always true since errors in plans or in execution of the work may necessitate the removal and rebuilding of certain portions. In such cases the value of the original labor and either all or part of the original material may be lost. When the contractor is at fault, he must bear the expense; when the company is to blame, it incurs an additional expense, either on contract work or on company construction. The proper treatment of this additional expense to the company constitutes a pertinent problem. Since the extra expenditure is actually made on new construction it might be construed to be a charge to the investment. However, the value of the completed work is not increased by the amount of this expenditure: the asset will be worth no more than it would have been if it had been constructed correctly at the lesser cost. On this basis, conservative practice may favor charging the expense of errors of construction as a loss rather than as a part of the investment in fixed assets.

ACCUMULATION OF CHARGES

Sources of Charges

Having considered what constitutes the cost of new construction, we should consider how the charges can be accumulated to

furnish the necessary information for the record of investment. Since, as brought out earlier in this discussion, the final record should show the installed cost of each unit, the labor, material and other expenses must be accumulated by units. These various charges come from a variety of sources. The direct labor is ordinarily reported on daily time cards, on which are shown the hours spent on specific projects or operations. These time cards may be priced and summarized on a weekly or monthly recapitulation sheet in the case of a large organization where the time of men from many different departments may be charged to a project. Charges for materials may come from requisitions drawn on company warehouse or from invoices in the case of direct purchases. Traveling and living expenses will probably be reported on weekly or monthly expense statements. Bills from contractors will furnish the basis of contract charges. Expenditures for outside services, fees and permits will be obtained from the invoices rendered. If any form of overhead is included, it will be obtained from cost analysis schedules.

Use of Intermediate Record

Since there are so many sources of charges and since each charge may constitute but a small part of the total cost, large corporations must maintain an intermediate record in which costs are accumulated before the totals are entered in the final record. This procedure is also essential to the control of expenditures. In order to maintain proper control, corporations require heads of departments to

submit applications for expenditures. When these applications are approved they are assigned identifying serial numbers to which the respective expenditures are charged. For purposes of accounting, a detailed estimate arranged to show each unit separately should be submitted with the application, in order that the accounting department may accumulate costs for each of the items shown.

The intermediate record may consist of a separate sheet for each project, with columns for each unit, or it may consist of a separate sheet for each unit, with a control sheet for the project. Regardless of the form of the record, the various charges must be so reported that they may be entered on the sheets or columns to which they apply. In order to meet this requirement, time sheets, material requisitions and invoices must bear a complete description of the work involved. This method is not always practicable, particularly where there are many separate units involved, since the description must frequently originate from workmen who are neither competent to give the information nor interested in submitting an accurate description. If the accounting department is remote from the actual construction, the difficulties are increased, since much correspondence is necessary to obtain adequate explanations. A practical solution in connection with large projects is the assignment of separate job numbers for various parts of the work. If charges are identified by these code numbers, much detail is eliminated.

Reporting and Allocating Charges

The method of coding and reporting charges can be shown best by an example in which the following estimate may be assumed to be received by the accounting department.

Blacksmith Shop for Department A

1 - 30' x 20' metal building with concrete slab, wiring, and piping

2 - Forges

1 - Air hammer

1 - 50 h.p. motor

1 - Portable grinder

2 - Anvils

Separate job numbers might be assigned to the building, the forges, the air hammer, and the motor, while items for which there would be little expense of installation, such as the anvils and grinder, might be grouped together. If labor tickets, requisitons and invoices are coded with the appropriate numbers, the charges can be recorded in the proper columns or sheets by the accounting department. At the completion of the work, the cost of each unit would be totaled and transferred to the permanent records, with adequate descriptions.

The costs in the preceding illustration could be readily applied to specific units because of the simplicity of the work, but on large projects there are many costs which can not be assigned directly. Temporary facilities, such as electric, steam, air and water lines,

roads, sheds and cofferdams, might be installed and then removed at the completion of the work. The cost of these temporary facilities, less salvage value, constitutes a charge against the entire project which must be apportioned to individual units. The expenses of engineering and supervision must also be apportioned. Hence, these indirect costs must be accumulated separately and distributed at the completion of the work.

When work is done under contract the company will not be able to make its own distribution of charges directly. One way to obtain proper allocation is to require contractors to submit bids in detail in accordance with the ultimate analysis desired. The total contract payment may then be distributed over units on the basis of the bid. An alternative method is to require the contractor to submit his periodic requisitions for payments in detail showing how much of the payment applies to each unit. This procedure is less satisfactory than the first one since the contractor will be more interested in getting his money than in furnishing detail after he has been awarded the bid. In either case, the allocation of costs will be an estimate. Of course, on "cost plus" contracts the company will probably be able to make its own distribution of costs because it will have timekeepers and clerks actually checking the charges.

CHAPTER V

ADDITIONS - GOING PROPERTIES

SOURCES

Additions to the investment in fixed assets may occur, not only through the construction of new facilities, but also through the acquisition of properties already in operation. These acquisitions may be made in several ways, the first of which is the purchase of fixed assets only. In this case the company selling the property retains its corporate identity and, if only a part of its holdings are sold, may continue to operate other properties. The purchasing company does not acquire stock-in-trade, trade names or accounts receivable; neither does it assume any of the current liabilities of the seller. The purchaser merely acquires properties which it might have developed itself. The problem of accounting for the purchase involves the allocation of a portion of the total price to each of the fixed assets acquired, on the basis of fair values.

Another way in which fixed assets may be acquired is through the purchase of an entire business. The seller, if a corporation, retains its corporate identity, although it may subsequently dissolve. The purchaser acquires inventories, accounts receivable, trade names and good will, although cash is generally excluded. There are many possible variations with reference to the extent to which the current liabilities are assumed. The present discussion is concerned primarily with the

assets which involve the problem of allocating the purchase price to each of the various classes of assets acquired, both current and fixed.

The entire business may also be acquired through the purchase of all the stock of a corporation. In this case all assets and all liabilities are acquired. The problem of accounting for the fixed assets depends upon the method of handling the corporation after the stock has passed into the control of the purchaser. If the corporation is dissolved, its assets become a direct addition to those of the purchasing company. If the corporate identity is retained, the assets are not a direct addition although controlled by the company owning the stock. Frequently only a part of the stock is acquired, in which case the corporate identity remains.

BASES OF VALUATION OF FIXED ASSETS PURCHASED

Possible Bases to be Used

Under either of the first two methods just mentioned, certain tangible properties such as land, buildings and equipment will be acquired. The total purchase price does not necessarily represent the depreciated reproduction cost of these assets. If the business previously conducted by means of these facilities has been profitable, the owners will not sell them unless offered an amount considerably in excess of their book value. The selling price will probably be based on the capitalized earning power. If a plant in which $50,000 has been invested is earning $10,000 a year, its value may be established at perhaps $100,000. If the plant is purchased for this amount, the value

to be recorded as an investment in fixed assets may be determined by either of two possible methods: the first is to value the assets on the basis of earning power; the second is to appraise the assets on the basis of reproduction cost new less observed depreciation, and to record the excess of the purchase price over this sound value as an investment in good will. If current assets, such as inventories, are included in the purchase they would be priced at fair market value and the amount so determined would be deducted from the total before the value of the fixed assets is established under either method.

Effect of Basis on Financial Statements

The two bases just described should be compared with reference to their effect on the financial statements. In order to make such a comparison, assume that the purchase price of a certain plant may be fairly allocated in either of the following ways:

Item	(A) Asset Value Based on Reproduction Cost Less Depreciation	(B) Asset Value Based on Earning Power	Depreciation Rate
Land	$ 30,000	$ 36,000	0
Building	50,000	60,000	5
Equipment	20,000	24,000	10
Good Will	20,000	- - -	
Total purchase price	$ 120,000	$ 120,000	

The correlative annual depreciation charges will be as follows:

	(A)	(B)
Buildings	$2500.	$3000.
Equipment	2000.	2400.
Total	$4500.	$5400.

Since the good will in method (A) was valued on the basis of earning power of the plant, it will be worthless when the assets have been consumed. Consequently, we are justified in charging operations annually with a part of the investment in good will, proportionate to the loss in value of the other assets. What this rate of amortization of good will shall be is impossible to determine exactly since each of the assets has a different length of life. Any rate less than that of the building will not be justifiable because when the building has become worthless the original plant will have ceased to exist. If the investment in good will is amortized over a period of twenty years the annual charge will be $1000, and the total annual charge against earnings under method (A) will be at least $5500. The total charges to earnings during the entire life of the plant will be $90,000 under method (A) and $84,000 under method (B). The difference of $6000 is represented by the amount of good will allocated to land.

The foregoing illustration permits certain definite conclusions. The valuation of assets on the basis of earning power results in a higher book value of the tangible assets and causes a greater annual depreciation charge. On the other hand, the valuation on the basis of sound value

results in a greater total annual charge because of the amortization of good will. However, if the entire inflation of values under the first method just mentioned is in depreciable assets, the total amount charged against earnings during the life of the plant is the same in each case.

There are certain definite objections to valuing the tangible fixed assets on the basis of their earning power. This capacity to earn is not entirely dependent on the physical condition of the properties since the ability of the managers of the business, the nature of the product, economic conditions within the specific industry and general business conditions are major factors in determining the extent of profits. All of these factors are variables which can not be definitely segregated and measured. Moreover, the extent to which the earning power of the plant will last is not dependent on the physical life of the properties. Profits may decrease because of increased competition; because the new owners are not as capable as the former ones; or because new inventions lessen the demand for the product. Hence, earning power is neither precisely determinable nor predictable. The fact that the purchase price of a plant was based on an estimate of profits, gives no assurance that those profits will continue. Moreover, the earning power can not be measured for each of the specific items of property, since it is derived from the plant as a whole.

To consider the matter further, we should recall that the use of fixed asset accounts is for the purpose of measuring the extent to which expenditures for property is consumed, based on probable useful life. The lengths of life of land and depreciable structures may be

reasonably forecast; how long a definite earning power will remain is impossible to predict. In view of this difference, and in view of the arguments presented in the preceding paragraph, we may conclude that a segregation of the total purchase price between tangible properties and good will is desirable for accounting purposes. The tangible properties may be conceived to have a measurable value based on reproduction cost less observed depreciation. The rate at which this value is lost is directly related to the useful life of the properties, independent of extraneous economic factors. The remainder of the purchase price represents the intangible value of earning power or good will, the life of which is indeterminate. By this segregation we have separated the measurable factors from the indeterminate, and we have placed the investment in properties purchased after use on the same basis as the investment in new construction.

VALUATION OF ASSETS PURCHASED

Land

The factors underlying the valuation of properties on the basis of reproduction cost less depreciation will now be considered in detail for each class of fixed assets, the first of which is land. The value of a specific site is dependent upon its location with reference to transportation facilities, power, markets, labor supply and similar economic facilities. Since there is competition for land, there will be a market price for it which may be determined by ascertaining the selling price of similar sites. In actual practice, the valuation may best be

established by a realtor or appraiser who is familiar with the locality, since he will be acquainted with the current real estate market.

Leases and Good Will

Although the valuation of leases has been discussed in a previous chapter, that discussion was with reference to the purchase of new sites for development. When the acquisition of properties already in operation includes the purchase of a lease together with structures and improvements, the problem of valuation is more complex because the total price includes payment for the tangible property, the value of the lease and, in some cases, good will. The theory previously discussed in connection with land may be applied with reference to the tangible assets at a leased location. On this basis, the value of the equipment and improvements will be their reproduction cost less the observed depreciation. The values of the lease and the good will, however, are rather closely linked together since both are dependent to some extent on earning power. A theoretical distinction is possible on the following basis. The value of the lease may be conceived to be the difference between the total higher rental that would be paid if a new lease were required and the actual total rental to be paid during the remainder of the lease. This differential would occur if the rental value of the land had risen above the level upon which the lease rental was based. The rental value referred to is the market value for similar sites and is independent of the specific plant on it. Such a market exists since there is competition for the use of a site by various types of industry.

On the other hand, the value of good will may be considered to be directly dependent upon the specific business conducted upon the location, as pointed out in a previous section. An example may make the distinction more clear. Assume that a lease is purchased together with a building and equipment on the leased site for $150,000. Also assume the following:

Years of lease remaining	10
Fixed rental under lease	$4000 per annum
Current market rental	$6000 per annum
Reproduction cost less depreciation for building and equipment	$75000

From the foregoing data the value of the lease may be computed as follows:

Total rental that would be paid if lease were not acquired	10 x $6000 =	$60,000.
Total rental to be paid under terms of the lease	10 x $4000 =	$40,000.
Difference = value of lease =		$20,000.

The good will is determined as follows:

Total purchase price		$150,000.
Deduct:		
Building and equipment	$75,000	
Lease	20,000	95,000.
Difference = value of good will =		$ 55,000.

This analysis does not necessarily represent the way in which the original offer for the business may have been determined, for the amount of $150,000 may have represented capitalized earning power or the purchase of a definite number of years' profits. Regardless of the basis, some definite allocation of the total payment must be made on the books. The method outlined seems theoretically fair since it places the investment in leases on a basis comparable with that for sites which the company owns in fee. Moreover, the period during which the investment in the lease will remain of value can be forecast fairly accurately. Of course, the resale value of the lease may drop if rental values decrease, but this possibility is offset by the tendency of land values to increase over a period of years. Certainly the valuation of the lease can be substantiated on the basis of known facts at the time of the purchase. On the other hand, the value of the good will is much more of an estimate and the extent to which it will last is much less predictable. However, the distinction between the value of the lease and that of good will is not always made in actual practice because the two are so closely related. Even so, the segregation seems to be a valid one.

If the value of the lease is segregated and determined in accordance with the theory just developed, the current market rental may be ascertained by consulting a local realtor or broker familiar with similar locations. As in the case of land, the local real estate men are able to make a sound estimate because of their knowledge of current transactions.

Factors Affecting Reproduction Cost of Depreciable Property

The valuation of the depreciable improvements and equipment requires even more detailed investigation than that required for land or leases because of the greater number of items to be valued and the numerous factors that influence the value of each item. These factors may be segregated between those affecting reproduction cost and those affecting observed depreciation. Reproduction cost is dependent, first, upon type and quality of construction. Buildings, for example, may be: wood frame and clapboard; wood frame with sheet metal siding; all steel; wood frame with brick veneer; mill type with wooden columns and beams and brick walls; brick and concrete, consisting of concrete foundations, columns, beams and floors and brick walls; all concrete. Concrete construction may be further divided between flat slab and beam and girder. If two buildings of the same general type are designed for different live loads, the one built to accommodate the greater load will have larger members and consequently a much higher cost. Furthermore, two buildings alike in type and size may have very different costs because of differences in the land on which they are erected. One built on solid ground will have a relatively inexpensive foundation. On the other hand, a building erected on marsh land may require very expensive foundation work involving piling, concrete piers, extensive excavation and possibly the sinking of caissons. Building costs will also differ because of differences in interior finish. For example, one concrete building may have plastered walls, furred and plastered ceiling, composition flooring and

plastered tile or Pyrobar partitions, while another may have only painted walls and ceiling, bare concrete floor, and metal partitions. Differences will also occur in lighting, heating and ventilation. Although the foregoing distinctions regarding type of construction are of primary importance, the quality of the work is also a factor to be considered. One building may be substantial and weatherproof, while another may be faulty because of poorly laid brick, lean mortar, badly fitted window frames and other poor work arising from carelessness or deliberate scrimping. Although buildings have been used here as illustrations of differences in types and quality of construction, similar differences will be present, of course, in all the various fixed improvements and equipment which may comprise a plant. Hence, reproduction costs must be estimated with reference to each specific unit.

Another factor to be considered is the current market price. In the case of a building, the prices of labor and all the specific items of material must be taken into account; for equipment, such as motors, lathes, furniture and similar items, the current selling prices should be used. These reproduction costs for both construction and equipment are dependent upon both the general price level of all commodities and the price of specific commodities. The influence of the general price level may cause the estimated reproduction cost to be higher or lower than original cost. A similar difference may be caused by changes in the price of specific items of labor, material and equipment as a result of changes in production costs or demand within the industries involved. The market price of a commodity may represent a number of combinations of

these influences acting singly, cumulatively or oppositely. Thus an increase in current price may represent merely an increase in the general price level, an increase from causes affecting the specific item only, a combination of both, or an increase of one of these factors greater than a decrease of the other. A decrease in market price would arise from converse influences. Of course, these influences will cause changes after the appraised value of the assets has been recorded on the books but the purpose of accounting is not to reflect these subsequent changes, as previously stated.[1] What we are concerned with in this discussion is the effect of these influences on the value of the depreciable property at the time that it is acquired. From the point of view of the purchaser, this value is more nearly dependent upon current cost than upon original cost because second hand values will naturally follow the movements of prices of new property.

Factors Affecting Observed Depreciation

Although the reproduction costs are a direct function of current prices, the appraised values are not directly proportional to those prices, because of the very important factor of depreciation actually sustained by the property. This depreciation does not necessarily coincide with the accruals recorded on the books of the seller or with an estimated accrual based on the application of straight line rates from date of original installation. The actual depreciation depends, not only upon the length of service and amount of use of the property,

1. See page 33

but also upon the extent to which the property has been kept in repair. One of two similar pieces of equipment may show but little deterioration because of careful treatment, while the other, although no older, may be very dilapidated because it has not been properly maintained and repaired. Furthermore, the observed depreciation must include an allowance for extraordinary obsolescence actually sustained in addition to the normal obsolescence ordinarily included in the determination of book rates of depreciation.[1] Because the amount of physical deterioration may be different for each item of plant, and because the extent of obsolescence will vary for different types of equipment, a detailed survey should be made of every item in order that an accurate estimate may be made of the true depreciation to be deducted from the reproduction cost.

Procedure in Valuing Depreciable Property

Since the valuation of the depreciable property involves technical investigation and computation requiring the services of engineers, the work must be done by an appraisal company or by trained men within the organization of the purchasing company. In either case, schedules of current costs must be available for estimating construction and prices of equipment must be obtained. When the valuation is made by the purchaser's own personnel, data for estimating costs may often be obtained from the records of recent construction of similar facilities by the company. Likewise, the prices of both regular and special equipment may be obtained from records of recent purchases or from manufacturers' price lists.

1. See page 40

The work of valuing the property necessitates a detailed physical inventory which must show all the quantities, descriptions and dimensions necessary for the preparation of estimates of reproduction costs of the various assets. The inventory must also indicate the physical condition and age of each item in order that the depreciation may be determined. A very important requirement is that the field inventory shall be so reported that costs may be estimated for units of plant in accordance with the company's classification of fixed assets. Furthermore, the items inventoried should be checked with deeds, leases, bills of sale, agreements and maps to determine whether there are any assets to which the purchaser can not legally claim title either because they were not owned by the seller or are not within the boundaries of the land acquired. For example, the inventory may include a railroad siding which, upon comparison with a plan, deed or other document, is found to be on land of the railroad, with title vested in the railroad company. Where properties purchased are occupied by a lessee, care must be taken to avoid including equipment owned by the lessee in the valuation of assets purchased. After ownership of the properties has been checked, the estimate of reproduction cost less depreciation must be computed by engineers acquainted with the types of construction within the industry under consideration. The estimate should be arranged in a form that will permit its transcription upon the plant records without further summary or analysis.

VALUATION OF ASSETS ACQUIRED BY PURCHASE OF STOCK

Although the preceding discussion has been with reference to the direct purchase of property, a company may also acquire assets by purchasing the entire capital stock of another company, as previously mentioned. If the acquired company retains its identity as a separate corporation, the transaction will have no effect on the fixed asset accounts of the purchaser since the purchase will be recorded as an asset under "Investments". Moreover, the values of the assets shown in the accounts of the acquired company will not be affected. However, if this subsidiary company's classification of fixed assets does not conform to that of the parent company, the subsidiary's classification may be revised to permit uniform statistical comparisons and consolidated financial statements. This revision will involve changes in the distribution and grouping of the component items in the asset accounts, without increasing or decreasing values. The assets will continue to be shown at the cost to the subsidiary, while the reserves will be the amount actually accrued by it.

When the acquired corporation is dissolved, either immediately after the purchase of the stock or at any subsequent time, its properties become a direct addition to the fixed assets of the purchasing company. If the values on the books of the subsidiary have been recorded in accordance with sound accounting principles, those values should be transferred to the records of the parent company. The costs and the accrued reserves for depreciation should be transferred to the respective

asset and reserve accounts of the parent corporation in order that the depreciation accruals may be perpetuated on the same basis as established by the subsidiary. That this procedure is desirable for subsequent depreciation calculations may be seen by a simple illustration. Assume that the accounts of the subsidiary included a machine to which the following data applied:

Date purchased	July 1, 1935
Cost	$100
Depreciation rate	10%
Depreciation reserve at date of merger (July 1, 1940)	$ 50
Book (depreciated) value at date of merger	$ 50

If the net book value is transferred to the asset account of the parent company, a new depreciation rate must be computed as follows:

Estimated original life	10 years
Remaining life	5 years
New rate	20%
New base	$50

If there were twenty of these machines, all of which had been installed at different dates, a different rate would be necessary for each machine. This difficulty is avoided by transferring both the original cost and the correlative reserve because the original rate of 10 per cent can be used for the entire group. The procedure is important in the case of a corporation having a large investment in fixed assets classified according to depreciation groups since a tremendous amount of clerical work

would be caused by the introduction of a large number of different rates as the result of the merger of extensive additional properties.

CHAPTER VI

REPAIRS, REPLACEMENTS AND IMPROVEMENTS

DISTINCTIONS TO BE RECOGNIZED

Newly Acquired Property

The discussion up to this point has been with reference to outright additions of complete units of fixed assets. After these units have been constructed or acquired, they may be repaired, replaced or improved. Expenditures for such work on newly acquired properties, when the work is done to make the new units serviceable or to bring them up to company standards, constitute a proper charge to the fixed asset. For example, when a building already in operation is purchased, it may require roofing, painting and other repairs. If the building is fairly valued on the basis of reproduction cost less depreciation at the date of purchase, the valuation will take into consideration the necessity for these subsequent expenditures. Since a higher value would have been recorded if the repairs had been made prior to the purchase, the lower value actually recorded in the fixed asset accounts should be increased by the amount of the expenditures made immediately after the acquisition. This procedure is further justified by the fact that since the repairs were not made necessary through the use of the property by the purchaser in past operations, the cost of those repairs constitutes a charge to future operations, through the medium of depreciation. The cost of rearranging partitions, installing additional lights, and similar work is also a proper charge to the fixed asset account, for the reason just given, in the case of the building

mentioned above.

Property in Operation.

After structures and equipment have been placed in service, they must be repaired, replaced or improved from time to time in order to maintain or increase the operating efficiency of the plant. Thus the building used as an illustration in the preceding paragraph might require another coat of paint or a new roof in a few years because of deterioration from sun, wind and rain. This work would be done in order that the building might continue to serve the purpose for which it was acquired. New supports might be placed under a floor because it had become worn or weakened by vibration. On the other hand, the supports may be required to accommodate heavier machinery than was originally installed, rather than to counteract deterioration. The partitions might again be rearranged to accommodate new operations or to make existing operations more efficient. Some of the machinery might be replaced because it had become worn out or obsolete. The accounting treatment of the expenditures for the foregoing work requires further consideration since that work arises from causes different from those for new construction or rehabilitation of newly acquired properties.

Three distinct classes of expenditures are mentioned in the preceding paragraph. The first includes the cost of maintaining the property in a serviceable condition, of which the expense of painting is one example. Although the painting will prevent an excessively

rapid decrease in the value of the building, it will not increase the normal life of the structure since this normal life, as estimated for depreciation, is predicated upon a reasonable amount of periodic repairs. Therefore, the expense of these repairs constitutes a charge against earnings as a part of the direct cost of using the property. The attitude of the Treasury Department toward this policy is expressed in Regulations 86 as follows:[1]

> "The cost of incidental repairs which neither materially add to the value of the property nor appreciably prolong its life, but keep it in an ordinarily efficient operating condition, may be deducted as expense, provided the plant or property account is not increased by the amount of such expenditures. ----"

Another class of expenditures which is represented above includes the costs of replacing units or parts of units, as illustrated by the renewal of weakened supports under a floor or the replacement of machinery worn out. Since these expenditures are made for the purpose of maintaining or restoring the productiveness of the plant, their accounting treatment is closely related to that for the expense of repairs.

The third class of expenditures which was included in the illustrations comprises those that are made to improve the property by increasing its productiveness rather than to arrest or overcome deterioration. The installation of additional supports to accommodate heavier equipment and the rearrangement of facilities to increase the efficiency of the plant are two of the examples which may be recognized as improvements.

1. U.S. Treasury Department, Bureau of Internal Revenue, Regulations 86, Income Tax, Article 23(a)-4

Since this class of expenditures is rather closely allied to repairs and replacements, the distinction between the three groups should be considered further.

REPLACEMENTS

Possible Methods of Accounting

Before the specific types of replacements are discussed, the possible ways in which the expenditures for all types may be recorded should be investigated. One method is to charge the asset account with the cost of the new facility and to eliminate the investment in the original property by deducting the original cost from the asset account and the accrued depreciation from the reserve account. If the original asset is not fully depreciated at the date of replacement, there will be a loss equal to the cost less the reserve less the salvage value. Another method is to charge the cost of the replacement directly against current earnings, allowing the original cost and the correlative reserve for depreciation to remain undisturbed. A third way is to charge the new expenditure against the reserve for depreciation without changing the asset account.

Effect of Method on Financial Statements

The effect of the three methods may be shown by a hypothetical example embracing the following conditions for the replacement of a certain asset with identical property:

Cost of old asset	$1000
Age	10 years
Depreciation rate	10 per cent
Accrued depreciation	$1000
Salvage value	0
Cost of new asset	$1000

Result under each method of charging replacement

	A If charged to asset	B If charged to earnings	C If charged to reserve
Asset Account	$1000	$1000	$1000
Reserve Account:			
after 1 year	100	1000	100
" 2 years	200	1000	200
" 3 years	300	1000	300
" 10 years	1000	1000	1000
Charge against earnings:			
First year	100 (a)	1000 (b)	100 (a)
Second year	100	-	100
Third year	100	-	100
Tenth year	100	-	100

(a) annual depreciation charge

(b) replacement cost

The net value of the asset in the years subsequent to the replacement is the same for both method A and method C because of the following transaction:

	Method A	Method C
Asset:		
Before replacement	$1000	$1000
Deduct old asset	1000	-
	-	$1000
Add new asset	$1000	-
After replacement	$1000	$1000
Reserve:		
Before replacement	$1000	$1000
Deduct:		
Accrued Reserve	1000	-
Cost of Replacement	-	1000
Immediately after replacement	-	-
Net value	$1000	$1000

Under both methods annual depreciation will be computed on the basis of 10 per cent of $1000 for the ensuing ten years. On the other hand, no further depreciation will be computed under method B since the original investment which remains unchanged was fully depreciated when the replacement was made.

Since the foregoing example only shows the effects when the original asset is fully depreciated, we should investigate the results that would be obtained by the three methods if the original asset was replaced before the expiration of its normal life. If the replacement was made when the asset was only eight years old, the accrued reserve would be $800. Under these conditions, the following results will be obtained:

	A If charged to asset	B If charged to earnings	C If charged to reserve
Asset	$1000	$1000	$1000
Reserve:			
Immediately after Replacement	-	800	-
After 1 year	100	900	100
" 2 years	200	1000	200
" 3 years	300	1000	300
" 10 years	1000	1000	1000
Charge against earnings:			
First year	300	1100*	300
Second year	100	100	100
Third year	100	-	100

*Replacement cost($1000) plus depreciation ($100)

The charge under method "A" in the first year is determined as follows:

Loss on asset replaced:		
Original cost $1000		
Reserve	800	$200
Depreciation of new asset		100
		$300

The charge under method "C" in the first year is determined as follows:

Excess of replacement cost over accrued reserve	$200
Depreciation of new asset	100
	$300

However, if the entire amount of $1000 is charged to the reserve, the annual depreciation charge must be $120, based on the accruals necessary to provide for the deficiency of $200 created in the reserve, in addition to the cost of the replacement.

Both of the foregoing examples failed to consider the effect of either salvage value or a difference in replacement cost. Since the inclusion of salvage value will only result in a slight reduction in the charge against earnings, the effect need not be analyzed further. The effect of an increase in the replacement cost may be shown by the following example in which the data previously assumed will be used, except the replacement cost which will be taken as $1200.

	Result under each method of charging replacement			
	A	B	C	
	If charged to asset	If charged to earnings	If charged to reserve 1	2
			To extent of Accrual	Entire Amount
Asset	$1200	$1000	$1000	$1000
Reserve:				
Immediately after Replacement	none	800	none	-400
After 1 year	120	900	100	-260
" 2 years	240	1000	200	-120
" 3 years	360	1000	300	20
" 10 years	1200	1000	1000	1000
Charge against earnings:				
First year	320[a]	1300[b]	500[c]	140[d]
Second year	120	100	100	140
Third year	120	none	100	140

(a) Loss of $200 plus depreciation of $120 on new basis

(b) Replacement cost of $1200 plus depreciation on old basis of $100

(c) Depreciation of $100 plus excess of new cost over reserve of $400

(d) Depreciation on basis of deficiency of $400 plus old basis of $1000

This illustration shows that the lowest net values of the asset are given by charging the replacement directly against earnings, while higher values arise by charging the expenditure to either the asset account or the reserve for depreciation. The charge to earnings is greater

in the first year than in the ensuing ones under all methods except "C2". The greatest charge to earnings in the first year results from charging the replacement directly to earnings, although that method gives the lowest charges in subsequent years. These general effects upon balance sheet and earnings statement will hold true for various combinations of replacement cost and age of original equipment although the weights of these factors will change the proportional relation of the specific charges and values. When the expenditures for the replacement are less than the original cost the general tendencies just stated will also be present.

Replacement of Entire Unit

The method to be used should now be considered with reference to the various types of replacement, the first of which is the replacing of an entire unit of plant of substantial size, such as a building, a motor truck or a lathe. Since the original asset ceases to exist under such circumstances, it has no value, and no part of the original expenditure will constitute a cost of using the new asset. The results which reflect the true conditions most accurately seem to be obtained by eliminating the investment in the old asset and by charging the cost of the new facility to the asset account. By this method operations subsequent to the replacement are charged with depreciation based on the investment in the new equipment whose useful life begins at the date of replacement. Moreover, the identity of the specific unit of plant is maintained on the records. This is an important consideration when there

is an extensive investment in many fixed assets for which a detailed record of each important unit is maintained.

When the equipment replaced is a relatively small item, the method just described may require an amount of clerical work that is not consistent with the basic accuracy of the system of accounting. In such case, the replacement may be charged directly to earnings, without disturbing the asset and reserve accounts. Companies sometimes follow this procedure for small tools by charging the initial investment in the normal supply of such equipment to an asset account for which no depreciation is computed. Subsequent expenditures for replacements are charged directly to earnings on the basis of the assumption that the replacements maintain the supply of tools at its original level of efficiency.

Replacement of Part of a Unit

When only a part of a unit is replaced, the method of accounting for the expenditure will depend upon the effect of the replacement upon the life and value of the property. If the replacement does not increase the life of the property or add to its value, the expenditure constitutes a proper charge to the cost of operations in the period in which it is made. When the replacement increases the life of a unit the effect of the expenditure should be reflected in the cost of future operations by means of the depreciation charge. The examples previously given show that this may be accomplished by charging the expenditure to either the asset or the reserve account. The method of charging the reserve account is probably the most desirable theoretically, because the effect of

the expenditure has been to reduce the physical deterioration as reflected in the reserve account rather than to increase the original cost as shown in the asset account. A practical advantage of this method is that the identity of the original item is retained in the asset record. Moreover, this procedure is in accordance with the requirements of the Treasury Department which are stated in Regulations 86 as follows:[1]

> "----. Repairs in the nature of replacements, to the extent that they arrest deterioration and appreciably prolong the life of the property, should be charged against the depreciation reserve if such account is kept."

The nature and extent of the replacement determines whether the life of the property will be prolonged or merely maintained at the length upon which the depreciation rate is based. The renewal of a minor part of a structure or piece of equipment will not ordinarily extend the life of the unit. For example, the installation of a new valve in a reciprocating pump will maintain but will not increase the normal period of usefulness of the entire apparatus. On the other hand, the replacement of a major portion of a unit will generally extend its life, as in the case of the renewal of a large number of plates in a fabricated steel tank.

IMPROVEMENTS

A class of expenditures closely allied to replacements comprises those which are made to increase the earning power or capacity

1. Regulations 86, Income Tax, Art. 23(a)-4

of fixed assets. The improvement may occur through an increase in the size of a unit, the substitution of equipment of improved design or the relocation of various facilities.

Increase in Size of Unit

Since the value derived from an expenditure which increases the size of a unit extends over a period of years, the cost of the improvement should be charged to the asset account. When the increase in size is obtained by replacing parts of a structure or a piece of apparatus with larger members, a question arises regarding the method of accounting for the increase in value. If the entire cost of the new parts is added to the asset account without making an adjustment for the depreciated value of the parts removed, the value of the investment will be inflated. Furthermore, operations in the ensuing years will be charged with depreciation of the old parts from which no service will be derived because they will no longer exist. One way of overcoming this difficulty is to charge the asset account for only the excess of the expenditure for the new parts over the cost of the old. The desirability of this method is doubtful because of difficulty in both the theoretical and practical allocation of the total new expenditure which includes in addition to the cost of the new parts, the expense of removing the old ones and installing the new. Another way of accounting for the replacement is to charge the asset account with both the cost of the new material and the expense of installation. The investment in the old parts should then be eliminated by crediting the asset account for the

proportion of the original cost representing the facilities removed and by charging the reserve account for the correlative amount of accrued depreciation. Any excess of cost over the amount reserved for depreciation would have to be charged to earnings as would the expense of removing the old parts. The argument in favor of this procedure is that neither the investment in the original parts nor the cost of removing them is an element of the tangible value or earning power of the property in its improved condition.

Improvement in Design

The discussion in the foregoing paragraph would also apply to expenditures for improvements arising from the substitution of parts of improved design which increase the capacity or efficiency of a piece of equipment. When the improvement is a minor one incidental to replacements made to overcome normal deterioration, any attempt to measure the extent of the increased value is impracticable. The asset account should be charged with only those expenditures which are made for the specific purpose of increasing the value of the property.

Relocations

One other possible source of improvements which was mentioned was the relocation of structures or apparatus. If the rearranging is done to increase the earning power of the plant, the expenditure may be charged to the asset account in order that future operations which benefit by the change may bear the expense through the depreciation charge.

A possible objection to this procedure is that the value of the assets is inflated because no tangible property has been added. This danger of overstatement of values requires careful determination of what expenditures for rearrangement should be added to the investment. The cost of certain relocations, such as the moving of apparatus to permit the demolishing of other property, constitute a charge against earnings rather than against the investment.

CHAPTER VII

RETIREMENTS

Although most of the discussion up to this point has been with reference to the treatment of expenditures for the acquisition, upkeep or extension of fixed assets, the method of accounting for the investment in properties sold, dismantled, abandoned or destroyed by fire should be considered. In this chapter, the word "retirements" will be used as the general term for disposal of property by any of the specific methods just mentioned.

IMPORTANCE OF RECORDING DEDUCTIONS

Effect on Earnings Statement

The necessity for recording the deduction of fixed assets no longer in use depends, first, upon the effect on the statement of earnings in subsequent periods. When the investment has not been fully depreciated, the retention of the original cost in the asset account will result in the continuation of an annual charge for depreciation of property from which no benefit can be derived. Since the purpose of the charge for depreciation is to distribute the original expenditure over the useful life of the property, that distribution must cease when the useful life is terminated. The continuation of the charge will result in fictitious statements of earnings which may become greatly distorted because of extensive retirements, or because of the cumulative effect of the practice over

a period of years.

Effect on Balance Sheet

The significance of the balance sheet is also affected by failure to record retirements. The asset account includes the original cost of the property, while the reserve account includes an amount representing the proportion of that cost already charged against earnings; the difference between the asset and the reserve represents, theoretically, the extent to which the original expenditure is available for future operations. Since property that has been retired is not available for use, it can not have any value as an asset. If the original cost and the accrued depreciation are not eliminated from the correlative accounts, the values appearing on the balance sheet will be inflated. Even when the asset is fully depreciated, failure to clear the accounts will result in misleading financial statements, as a simple illustration will show. Assume that the following balance sheet is prepared:

Assets			Liabilities	
Current Assets		$200,000	Current Liabilities	$100,000
Fixed Assets:			Bonds Payable	200,000
Land		100,000	Capital Stock	400,000
Plant and Equipment				
Cost	$1,000,000			
Less - Reserve	600,000	400,000		
		$700,000		$700,000

Assume, further that an analysis of the accounts reveals the following condition:

	Cost	Reserve
Property in use	$700,000	$300,000
Property retired	300,000	300,000
Total	$1,000,000	$600,000

The fact that the balance sheet indicates a reserve amounting to 60 per cent of an original investment of $1,000,000 would lead to one of two conclusions: either the company has pursued a liberal policy in providing for depreciation, or the plant is becoming worn out and requires replacements. The analysis reveals that neither conclusion is correct since the original cost of the existing property is $700,000, against which a reserve of only $300,000, or approximately 43 per cent, has been provided.

Effect on Statistical Analyses

When assets retired are not fully depreciated, failure to eliminate the investment from the accounts will have an adverse effect on analyses and comparisons of operating costs. This can be illustrated by another example in which we assume that a comparison is to be made of the relative profitableness of two similar departments for which the following data are obtained:

	Department "A"		Department "B"	
Investment:				
Cost		$10,000		$12,000
Reserve		4,000		5,000
Net		$ 6,000		$ 7,000
Income		$ 4,000		$ 4,000
Expenses:				
Direct	$1,760		$1,760	
Indirect:*				
Taxes	180		210	
Insurance	60		70	
Depreciation(10%)	1,000	3,000	1,200	3,240
Net Profit		$ 1,000		$ 760
Return on Net Investment		16.66%		10.86%

* In this illustration, taxes and insurance have been assumed to be distributed in proportion to the net investment for purposes of cost accounting.

Assume that the investment in Department "B" was found to be as follows:

	Cost	Reserve	Net
Equipment in use	$10,000	$4,000	$6,000
Equipment removed	2,000	1,000	1,000
Total	$12,000	$5,000	$7,000

On the basis of the true investment in equipment, both the net profit and the return on net investment for Department "B" actually equal those of Department "A". The use of the unadjusted investment results in the showing of too low a rate of return on the investment for two reasons: (1) the investment upon which the rate of return is computed is inflated; (2) the net profit is fictitiously low. The improper calculation of net profit is attributable, in turn, to the inclusion of excessive charges for depreciation, taxes and insurance on the basis of the inflated investment.

ACCOUNTING PROCEDURE

The elimination of the investment in assets retired involves a credit to the asset account for the amount of the original cost, and a charge to the correlative reserve account for the amount of the accrued depreciation. There may be either a profit or a loss from the transaction, depending upon the relation between original cost, accrued depreciation, costs incidental to disposal, and the amount realized from salvage, sale or insurance. The determination and treatment of the gain or loss constitute the major problems of accounting for retirements.

Removals

The first case to be considered is the actual removal of plant and equipment. If the asset is not fully depreciated, there will be a loss equal to the difference between the original cost and the accrued depreciation. To that loss should be added the cost of demolishing or removing the property, since such expenditures do not create any additional assets but simply add to the costs incidental to the old facility whose life and value are terminated. Any amounts received from the sale of junk or second hand material, less expenses incurred in reclaiming and shipping the material, should be applied to reduce the loss. The fair salvage value[1] of materials and parts reclaimed for use elsewhere in the plant should also be credited against the loss.

When a unit of equipment or a structure is removed, but the foundation is left to be used for the support of a new structure, a problem arises regarding the credit to be allowed for the foundation. The most logical procedure seems to be to value the old foundation on the basis of its worth with reference to the new unit rather than on the basis of the depreciated value recorded in the accounts. This is particularly true when a new foundation would cost much less than the depreciated value of the old one. If the old foundation was designed for a much heavier load or larger structure, the new unit would utilize only a portion of the original supporting capacity. To burden the investment in the new property with an excessive charge for the old foundation would penalize the motive of economy which prompted

1. See Chapter IV for a discussion of the basis of valuation of reclaimed material.

the use of the old supports. The foregoing reasoning should be followed in the determination of the fair value of other similar portions of structures.

Abandonments

When property ceases to be useful in operations it may be abandoned but not actually demolished. If the structures and equipment do not have any substantial value for any future use, either for the purpose for which they were installed or for other possible uses, the investment may be eliminated. The conditions under which such retirements are made are similar to those in the case of actual removal, except that the expense of demolishing the abandoned assets is deferred. Since the value of the salvage can not be determined at the time of retirement, the actual amount realized when the property is finally disposed of should be applied to reduce the expenses incurred at the time of removal. The loss at the date of abandonment will consist of the difference between the original cost of the asset and the accrued reserve.

When the property has a potential value for future use, the total amount of the investment should not be eliminated from the accounts since there will be some remaining value as an asset. The extent of this residual value is dependent upon the type of construction. Equipment of such special design that it can not be converted to any use other than that for which it was originally erected will be worthless except as junk. Structures, such as buildings, of a general type that may be

readily adapted to uses other than the original ones may have a fairly substantial value if they are in good condition. What that value will be depends upon the probable cost of converting the structure and the relative profitableness of any possible use in the future. Although the residual value will depend on specific conditions, it may be based approximately on an estimate of the difference between the second hand value after conversion and the cost of converting. The difference between the depreciated value of the original investment and the residual value will constitute a loss at the time of abandonment. When the foregoing method is difficult to substantiate, or when the depreciated investment fairly measures the future worth, conservative practice may favor retaining the original investment undisturbed until actual disposition is made of the property.

The preceding discussion applies only to those cases where property is permanently abandoned. When facilities are idle because of the temporary curtailment of production, no adjustment of the investment is desirable because of the impossibility of predicting the extent to which use of the assets will be resumed.

Sales

If property is sold instead of demolished or abandoned, the amount realized from the sale will reduce any loss arising when the asset is not fully depreciated. The net realization consists of the difference between the selling price and any expenses incurred by the seller because of the transaction, such as legal fees for transfer of

title, brokers' commissions, expenses of loading and shipping, and the cost of dismantling or reconditioning. If the net amount realized exceeds the depreciated value of the property, there will be a gain from the sale rather than a loss.

Destruction by Fire

When property is completely destroyed by fire, the determination and treatment of the loss will depend on the terms of the insurance policy and the basis of settlement finally adopted. Whatever is received in settlement should be applied to reduce any loss arising from the destruction of the assets. A desirable method of procedure is to open an account for the claim which may be charged with the depreciated value of the property and all costs incurred in demolition or reclamation; the value of salvaged material and the amount received in settlement of the claim may be credited to the account; any difference will measure the extent of gain or loss. One reason for the creation of a gain or loss, even in the case of full coverage, is the difference that may exist between insurable values and recorded values because of the effect of changes in reproduction costs and because of the distinction between actual and recorded depreciation.

Treatment of Gain or Loss

The disposition of the gain or loss arising from any of the foregoing classes of retirements depends, theoretically, upon the relation of the gain or loss to past, present and future operations.

When an asset is abandoned or removed because it has become worn out prior to the expiration of the life upon which the annual charge for depreciation was based, there will generally be a loss. This loss may be charged to surplus on the basis of the theory that the loss represents a deficiency in the charge for depreciation during the previous years when the asset was in use. Similarly, a gain caused by a large realization from salvage may be considered to represent an excessive allowance for depreciation in prior periods. However, a loss caused by the premature retirement of property because of inadequacy or sudden obsolescence can not be considered as representing any deficiency in the charges against previous operations since the necessity for the allowance was not predictable. If the assets retired under these conditions are to be replaced with more modern facilities, the argument may be advanced that the loss constitutes a part of the cost of using the new equipment in future operations. While this theory is sound from the point of view of engineering economics, it does not apply to conventional accounting procedure which is concerned with charging operations for a proportion of the original cost of those assets actually in use.

The policy frequently followed is to apply gains or losses from retirements directly against current earnings. This procedure is justified by the practical argument that the gain or loss is actually incurred when the asset is retired; even though the depreciation charge attempts to measure the loss of value, the result is only an estimate which is expected to require adjustment in the end. In a large corporation the effect of retirements can be reflected better in the

statement of profit and loss than in the surplus account on the balance sheet.

REQUIREMENTS OF FEDERAL INCOME TAX REGULATIONS

The preceding discussion has been with reference to the determination and treatment of gain or loss for accounting purposes. Since the amount of gain or loss to be reported for purposes of the federal income tax is limited, the general requirements of the existing regulations should be considered.

Losses Recognized

The existing law allows a loss arising from removals[1] and permanent abandonments[2] except under the following conditions as stated in Regulations 86[3]:

> "If an account reflects the cost or other basis of more than one item of property it will be presumed that the rate of depreciation used is based upon the average lives of such assets. Losses claimed on the normal retirement of assets in such a group are not allowable, inasmuch as the use of an average rate contemplates the normal retirement of assets both before and after the average life has been reached and there is,

1. U.S. Treasury Department, Bureau of Internal Revenue, Regulations 86, Art. 23(e)-2
2. Ibid, Art. 23(e)-3
3. Ibid, Art. 23(e)-3

therefore, no possibility of ascertaining any actual loss under such circumstances until all assets contained in the account have been retired. In order to account properly for such retirements the entire cost of assets retired, adjusted for salvage, will be charged to the depreciation reserve account, which will enable the full cost or other basis of the property to be recovered. If the taxpayer by clear and convincing evidence shows that assets are disposed of before the expiration of the normal expected life thereof, as for example, because of casualty, obsolescence other than normal, or sale, losses on the retirement of such assets may be allowed, but only where it is clearly evident that such disposition was not contemplated in the rate of depreciation. In single item accounts or in classified accounts where it is the consistent practice of the taxpayer to base the rate of depreciation on the expected life of the longest lived asset contained in the account, the loss upon the retirement of an asset is allowable."

The desirability of using specific rates in accordance with the provisions of the last sentence in the foregoing quotation is evident when the effect of charging the loss from retirements against the reserve is considered. Previous discussion has indicated that the reserve should represent the extent to which the original investment has been charged to operations; and that the difference between the asset and reserve accounts should indicate the proportion of useful value

available for future use. If the loss from retirements is charged to the reserve the net value of the assets as stated on the balance sheet will be inflated. Moreover, the annual charges for depreciation in subsequent years will be increased by the amount necessary to provide for amortizing the loss on assets no longer in use.

Basis of Gain or Loss

The basis of the gain or loss is set forth in Regulations 86[1] as follows:

> "The cost or other basis must also be decreased by the amount of the deductions for exhaustion, wear, and tear, obsolescence, amortization, and depletion to the extent such deductions have in respect of any period since February 28, 1913, been allowed (but such decrease shall not be less than the amount of deductions allowable) under the Revenue Act of 1934 or prior income tax laws. The adjustment required for any taxable year or period is the amount allowed or the amount allowable for such year or period under the law applicable thereto, whichever is the greater amount. A taxpayer is not permitted to take advantage in a later year of his prior failure to take any depreciation allowance or of his action in taking an allowance plainly inadequate under the known facts in prior years. The determination of the amount properly

1. U.S. Treasury Department, Bureau of Internal Revenue, Art. 113(b)-1, page 197.

allowable shall, however, be made on the basis of facts reasonably known to exist at the end of such year or period. The aggregate sum of the greater of such annual amounts is the amount by which the cost or other basis of the property shall be adjusted."

The significant point of the foregoing restrictions is the limitation of the depreciation considered to be accrued to the total of the amounts "allowed or allowable," whichever is greater in each year. If the amount of depreciation charged to operations in past years has been less than the amount allowable, the deficiency can not be included in the gain or loss for tax purposes; consequently, the gain or loss determined for financial statements will differ from those computed for taxation. The use of this method is to the advantage of the government since losses are reduced and gains increased.

One further restriction should be noted. While losses sustained on removals and abandonments are allowable to the full extent of the basis just given, only a portion of the gains and losses arising from the sale of fixed (capital) assets is recognized. Since the determination of the amount to be recognized is somewhat involved, Regulations 86 should be consulted for the detailed procedure.[1]

1. U.S. Treasury Department, Bureau of Internal Revenue, Regulations 86, Art. 117-2.

CHAPTER VII

CONCLUSION

SUMMARY

A review of what has been presented in this discussion shows that modern methods of production require extensive expenditures for property whose usefulness extends substantially beyond the year in which those expenditures are made. Since operations in each of the years during which the property is used obtain some benefit from it, a part of the original expenditures should be charged against the earnings of each year, in proportion to the value derived. Because the investment in fixed assets is so large, its treatment definitely affects the statement of earnings and the balance sheet, with a consequent effect upon operating control, financial policies, investors' interests and the determination of the Federal Income Tax.

The first problem is the correct determination of the annual charge against earnings, based upon the extent to which the original expenditure is consumed through use. Since land does not suffer a loss of value from this cause, no part of its original cost constitutes a charge against periodic earnings. On the other hand, the value of a leasehold diminishes during the life of the lease. The investment in buildings, improvements and equipment constitutes the major class of fixed assets whose value suffers a definite decrease as a result of use in production. Since an exact determination of the reduction of value is impossible because of the number of variable factors affecting the life of each item

of depreciable property, a reasonable estimate must be used. The conventional method assumes that the life of a specific asset is predictable from past experience, and that the use of a predetermined annual rate of depreciation based on the probable life will fairly measure the periodic loss of value. Since this method results in the use of the same rate for assets that are alike, the computation of depreciation is facilitated by classifying the investment according to rates of depreciation. A further subordinate classification is generally necessary to facilitate departmental distributions of depreciation and other fixed charges based on the investment.

Since the amount of the charge for depreciation is dependent upon the original investment, as well as upon the rate, the determination of the proper charges to the investment and the allocation of those charges in accordance with the classification of assets are important. Moreover, the correctness of the values of the fixed assets appearing on the balance sheet is directly dependent upon the determination and allocation of expenditures for property. Additions to the investment may occur through the construction or purchase of new facilities, through the acquisition of properties already in operation, or through expenditures made upon properties previously constructed or acquired.

The construction of new facilities involves a determination of the proper charge to the investment in land, leases, and depreciable property. The cost of land and leases includes their purchase price, incidental fees and the costs of making the land suitable for use. The cost of constructing depreciable property includes expenditures for direct labor, material, freight, cartage, miscellaneous supplies, engineering,

supervision, rental of equipment, fees, permits and contracts. The determination of the charges for reclaimed material and indirect overhead must be on a conservative basis in order that the investment may not be inflated. Since the various charges for new construction come from so many sources, an intermediate record is desirable to permit the accumulation of costs in accordance with the classification of fixed assets.

Additions through the acquisition of properties already in operation involve the determination of the correct basis of valuation which is dependent upon the method of purchase. When either the fixed assets or all the assets are purchased directly, the total price, which is generally based on earning power, will exceed the tangible value of the properties. Under this condition two bases of valuation are possible: (1) allocation of the total purchase price to the property acquired; (2) valuation of the properties on the basis of an appraisal, the excess of purchase price over appraisal being charged to good will. The first method seems undesirable because the duration of earning power is indeterminate and because the allocation of a proportion of the total earning power to specific assets is practically impossible. The second method places the investment in acquired property on the same basis as that in property constructed by the accounting company. If an appraisal is made the values are generally estimated at the cost of reproduction less the observed depreciation, based on a detailed survey of the property.

The treatment of expenditures made subsequent to the construction or acquisition of property depends upon the extent to which the life and value of the property are affected. The cost of repairs that maintain the life of the property at the normal length upon which the rate

of depreciation is based is considered to constitute a charge against current earnings. Expenditures for replacements that prolong the normal life of an asset are generally charged to the reserve for depreciation, in order that future operations which benefit by the increased life may bear the cost through a continuation of the charge for depreciation. The cost of improvements arising from increased size or improved design are charged to the investment in the asset since future operations benefit from the increased earning power. Expenditures for the relocation of existing facilities may be charged to the investment when earning power is increased, although the practice may be objectionable because of the danger of inflating the investment beyond its sound value.

The investment in fixed assets removed, abandoned, sold or destroyed by fire should be eliminated in order that future operations may not be charged with depreciation of property from which no value can be derived. The difference between the original cost of assets retired and the accrued depreciation, less any amount realized, plus the costs of disposal, will constitute a gain or loss, depending upon the relation of these various amounts. Gains or losses attributable to errors in estimates of rates of depreciation may be applied against surplus since they represent excessive or inadequate charges to operations in prior years. On the other hand, since the gains or losses are actually created at the date of disposal, they may be considered to be applicable to the statement of profit and loss for the period in which the disposal is made.

Although most of the procedure summarized in the preceding paragraphs is in accord with the Treasury Department's requirements in

connection with the income tax, some modification is necessary because of certain changes in that Department's attitude, as expressed in Regulations 86. The annual depreciation deductible for purposes of taxation is limited to an amount based on the age, condition and remaining useful life of the property at the end of each year. This provision is not wholly in accord with the theory of uniform charges for depreciation based on a predictable life, since the value based on actual condition and remaining useful life of property will generally differ from the value reflected as a result of accruals created by the use of a predetermined rate. The Treasury Department also extends the limitation just mentioned to the determination of the gain or loss on retirements by restricting the allowance for accrued depreciation to the sum of the amounts allowed or allowable, whichever is greater in each year.

CONCLUSIONS

The significance of the results obtained by the conventional methods which have been considered in this discussion should be considered with reference to both the balance sheet and the statement of earnings.

Factors Influencing Results

The amount shown on the balance sheet as the cost of the assets is affected by the theoretical methods followed in its determination, and by the practical application of those methods. There are many opportunities for a choice of the theoretical basis in the valuation of properties ac-

quired, in the determination of what charges shall be included in the cost of new construction, and in the treatment of replacements. Even after the theoretical basis has been established, the practical application may vary because of the necessity for the exercise of individual judgment in the determination, reporting and allocation of charges. Since the basic data must be obtained frequently from the reports of workmen and foremen actually engaged in the construction, errors will occur because of the inability of the men to discriminate between the various types of work. Even when men familiar with the theoretical requirements are employed, as in the case of appraisals, the results are dependent upon the opinions of individuals in regard to the cost of reproduction and the condition of the property.

The determination of the annual charge for depreciation is likewise subject to variance in theoretical procedure and practical application. In the first place, the rate of depreciation is purely an estimate, since no exact determination is possible because of physical and economic variables; a specific rate will merely represent a closer approximation than a rate for a group which is admittedly an average. Furthermore, there is an opportunity for a choice of the method of determining and applying the rate. After the rate has been established, it must be applied to the original cost which itself is the result of estimates and the exercise of personal judgment, as mentioned above. A further dependence on estimates is caused by the necessity for allocating the original cost of assets in accordance with the classification according to rates of depreciation, because, while the total cost of certain facilities may be reasonably determined, the distribution of the total

among the component parts is often a matter of judgment, as in the case of work done under a contract.

Since the reserve for depreciation is created by the periodic charges for depreciation, it is subject to all the limitations encountered in the determination of those charges.

Significance of Results

A consideration of the factors underlying the determination of the values appearing on the balance sheet for the investment in fixed assets shows that those values are the result of estimates, opinions and approximations made in accordance with conventional practices. The amount appearing as the value of the assets represents the expenditures which have been considered to constitute the cost of property whose life extends beyond the year in which the expenditures are made. The reserve for depreciation represents the proportion of those expenditures that has been charged periodically against earnings. The difference between the asset and the reserve represents the amount to be charged to earnings subsequent to the date of the balance sheet. These values provide an index which must be interpreted with reference to the economic factors which the accounts do not reflect.

The amount of the periodic charge for depreciation represents an estimate, based on established conventions, of the decrease in value of the assets because of their use in the business during the period. Since the estimate can only be based on predictable factors, it is not intended to be an exact measure of deterioration, nor is it intended to measure the loss of value arising from economic causes. Any loss or gain

from the disposal of assets represents the effect of errors in the rate, or of changes of values not previously measurable by accounting procedure, either of which can only be recorded when the disposal definitely reveals them.

The amounts appearing on both the balance sheet and the statement of earnings will serve their purpose best as a guide to management, investors and creditors, when the accounting treatment has followed the consistent application of conservative and consistent theories.

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